## FINAL PILOT TREATABILITY STUDY REPORT

HOWE VALLEY LANDFILL HARDIN COUNTY, KENTUCKY

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Job No. 0064-001

## TABLE OF CONTENTS

	•	Page
PROJECT DESCRIPTION.	••••••••••	1
REMEDIAL TECHNOLOGY	DESCRIPTION	6
TEST OBJECTIVES		6
SAMPLING AND ANALYSI	is	6
EXPERIMENTAL PROCEDU	URES AND RESULTS	7
HEALTH AND SAFETY	• • • • • • • • • • • • • • • • • • • •	17
SUMMARY AND CONCLUSI	IONS	17
REFERENCES		

## **FIGURES**

	<u>Pag</u>	<u>[e</u>
1	CENTRAL AND OUTLYING AREAS OF THE SITE	3
2	AREAS INDICATING CONTAMINATION ABOVE THE SOIL ACTION LIMITS (SALs)	4
3	ORGANIC CONTAMINANT REMEDIATION SITE PLAN	8
4	SOUTH AERATION STOCKPILE1	.1
5	NORTH AERATION STOCKPILE1	.2

## TABLES

				<u> </u>	age
1	SUMMARY	OF	AERATION	ACTIVITIES	.13
2	SUMMARY	OF	ANALYTICA	AL RESULTS	.15

#### PROJECT DESCRIPTION

The Howe Valley Landfill Site is located in Hardin County, south of Vertrees, Kentucky. It lies 1.4 miles south of State Road 86 at the end of Tom Duvall Lane. The Site is positioned at the boundary of the Constantine and Howe Valley USGS quadrangle maps at coordinates of 37°40′05" N latitude and 86°07′30" W longitude. It consists of approximately 11 acres of sparsely vegetated land situated in a topographic basin. Approximately 2.5 acres of this site had been cleared for the landfilling of wastes.

Kentucky Industrial Services, Inc. conducted industrial waste disposal operations at the Site, possibly as early as 1967. The Site was operated as an industrial waste landfill until 1976 and was under permit by the state of Kentucky from 1970 to 1976. The Site has essentially been inactive since 1976, with access limited but not restricted. Types of wastes reportedly disposed at the Site consisted of manufacturing sludges, plating sludges, galvanizing wastes, silicone polymers, insulation and insulation by-products.

The Site was included on the Superfund National Priorities List (NPL) in accordance with Section 105(a)(8)(B) of CERCLA, 42 U.S.C. S9605(a)(8)(B). This site was proposed as a Superfund Site on June 10, 1986, 51 Federal Register 21106 (1986), and was finalized on the NPL on July 22, 1987, 52 Register 27623 (1987).

During the first part of 1988, two Potentially Responsible Parties, Dow Corning Corporation and Eagle-Picher Industries, Inc., agreed to conduct a Remedial Investigation/Feasibility Study (RI/FS). The RI/FS included studies to characterize the type, magnitude and extent of contamination, as well as to characterize, excavate and dispose off-site the buried waste at the Site. The RI/FS was completed in July 1990 and the Record of Decision was issued in September 1990. Dow Corning Corporation signed a Consent Agreement with EPA in February 1991 to perform the Remedial Design/Remedial Action (RD/RA).

Based upon the results of the waste characterization and removal activities conducted at the Howe Valley Site, the following information was obtained:

- A limited number of industries disposed of waste at the Site.
- Four general waste types were encountered (silicone polymers, plating sludges, insulation manufacturing chemicals and rubbish).
- Noncontainerized surface wastes consisted primarily of insulation and rubbish.
- Ninety-nine percent (99%) of the drummed wastes consisted of silicone polymers (90%) and metal sludges (9%).

 Essentially one hundred percent (100%) of the noncontainerized, buried industrial wastes consisted of silicone polymers (caulking compounds).

Although the entire study area was approximately 11 acres, the actual area where historical disposal activities occurred was limited to just over 2 acres. This disposal area was subdivided into two removal/treatment areas: 1) the central area which is just less than 1 acre, and 2) the outlying areas which total a little more than 1 acre (Figure 1). These areas were separated primarily on the basis that the metal sludge waste drums were almost entirely buried in the outlying areas and, while the silicone wastes were found throughout the disposal area, the noncontainerized silicone waste was buried only in the central area of the Site. This Pilot Treatability Study (TS) only includes the central, organically-contaminated area of the Site.

The field samples from the central area were analyzed for the four chemicals of concern: 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethene (1,2-DCE), 1,1,1-trichloroethane (1,1,1-TCA) and tetrachloroethene (PCE). It should be noted that a location designation such as 9.5C.5 3' means a point that lies halfway between north-south increments 9 and 10 (9.5) and halfway between east-west increments C and D (C.5), depth of sample, 3 feet (Figure 2). The alpha-numeric system was adapted to designate the sample location to avoid possible transcription errors due to reversals.

No cleanup goal/soil action level (SAL) has been established for 1,1-DCA. The only location where it was noted above the detection limit was at 11H at 3 feet, where it was detected at 13 mg/kg. In addition, four locations were analyzed for TCL. The organics found to be above acceptable levels are discussed below. It should be noted that during the sampling program, two of the subsurface locations (8E and 9.5C.5) were saturated.

#### 1,2-DCE

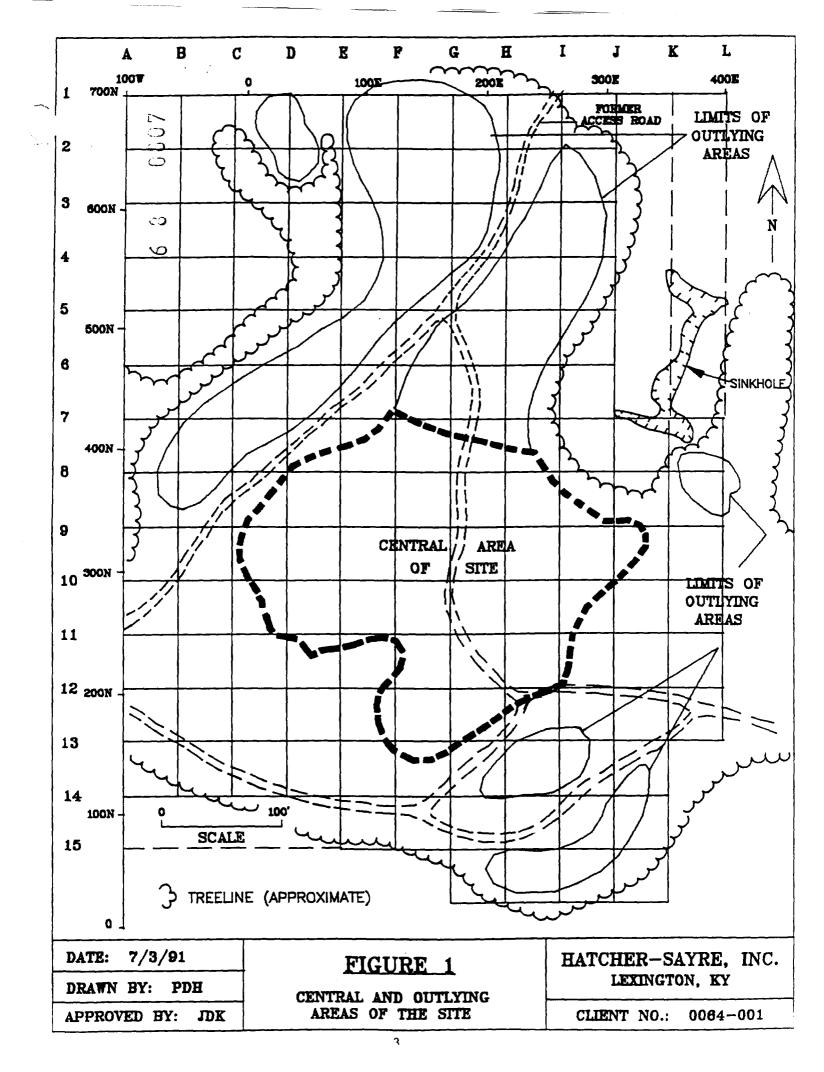
No 1,2-DCE was detected above the SAL on the surface or at a depth greater than 6 feet. The distribution of 1,2-DCE above the SAL occurred at Location 11E where the 3-foot samples showed 1,2-DCE at 15 mg/kg and 20 mg/kg (duplicate location).

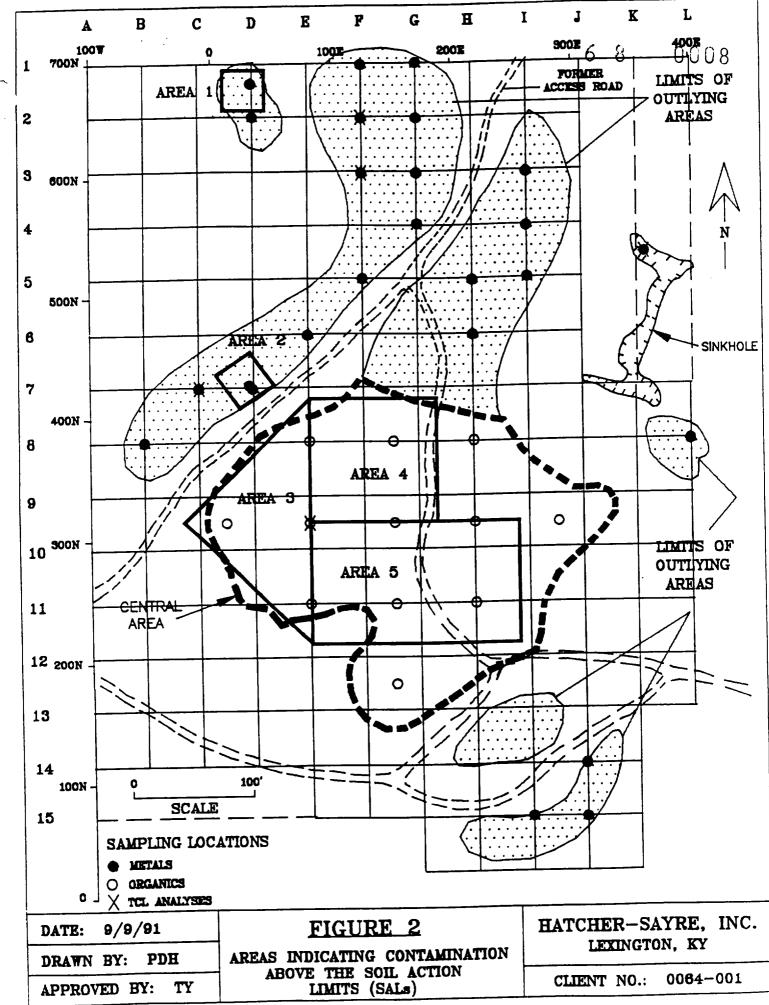
#### 1,1,1-TCA

No 1,1,1-TCA above the SAL was found in any surface sampling location. Two locations, both at 3 feet, had levels above the SAL; 9.5F.5 at 170 mg/kg and 11H at 340 mg/kg. Only one location at greater than 6 feet was over the SAL, 9.5C.5 at 200 mg/kg.

#### **PCE**

The only surface sample over the SAL for PCE was 80 mg/kg taken at 8E. Samples taken at 3 feet showed the broadest spatial





distribution of contamination. Samples taken from 8E, 8F.5, 9.5E, 9.5F.5, 11E and 11H exceeded the SAL. Samples taken at depths greater than 3 feet that exceeded the SAL were 8E, 9.5C.5, 9.5D.5 and 11E. No samples deeper than 3 feet were taken at 8F.5, 8H, 9.5E and 11E due to a high bedrock elevation.

#### \*\*\*\*\*\*\*

The selected remedy for the Site addresses the contamination remaining in the on-site soils and contamination that could be released into the groundwater. The principal threat to human health and the environment is from the possible ingestion of or dermal contact with the contaminated soils. A secondary threat would be from ingestion of contaminated groundwater. Currently, groundwater samples taken at Boutwell Spring indicate that contamination is below the MCLs or health-based levels.

The selected organic contamination remedy was anticipated to involve the following specific activities:

- Implementation of a Bench-Scale and Pilot-Scale TS to ensure that the aeration process will reduce organic concentrations to acceptable levels in the laboratory and under actual field operations,
- Installation of water diversion ditches to prevent water from running onto the aerating soils,
- Excavation and treatment, via on-site aeration, of approximately 7,400 cubic yards of central area soils that contain elevated concentrations of organics (Figure 2, Areas 3, 4 and 5),
- On-site air monitoring to ensure adequate protection of workers and nearby residents, and
- Revegetation of the Site to restore its natural conditions.

The Bench-Scale TS was conducted by the Dragun Corporation, Farmington Hills, Michigan. Based upon the Bench-Scale TS results, Dragun Corporation concluded:

- First, most of the PCE volatilized from Howe Valley soils a few hours after the study began. Under static air conditions, a volatilization rate of 41 mg PCE/m³/minute was determined.
- Second, smaller concentrations of PCE volatilize from the soil at a relatively lower rate.
- Third, PCE volatilization from low moisture content soil is somewhat faster than from high moisture content soil. The high moisture soil formed lumps which did not mix well, leading to unequal distribution of the PCE and to less soil exposure to the atmosphere.

Fourth, the results of this study show that the proposed remediation plan, which involves soil rototilling, should release VOCs from Howe Valley soils; residual VOC concentrations in these soils should be well below the SALs.

#### REMEDIAL TECHNOLOGY DESCRIPTION

The remedial technology consisted of exposing the contaminated soil to the air so that volatilization could occur (physical phase change). PCE is quite volatile and, as a result, is rapidly transported to the troposphere. Once in the troposphere, hydroxyl radicals attack the double bond, resulting in the subsequent formation of trichloroacetylchloride as the principal initial product (Andersson et al. 1975; Hanst 1978; Environmental Protection Agency 1975; Gay et al. 1976). This compound is readily hydrolyzed at ambient conditions (Morrison and Boyd 1973). however, is attacked by hydroxyl radicals more slowly than most other olefin pollutants due to the presence of four chlorine atoms (Environmental Protection Agency 1975). According to Yung et al. (1975), the tropospheric lifetime of PCE, based on its rate of reaction with hydroxyl radicals, is reported to be  $8.5 \times 10^5$ seconds, corresponding to a lifetime of about 10 days. [EPA 1979]

The most important aspect of the aeration technology is maximizing the surface exposure of the contaminated soil. The rototiller is utilized to break down the dirt "clumps" and increase surface exposure. Volatilization occurs faster during hot, dry weather conditions. Due to the high clay content in the soil, high moisture content tends to adhere the clay particles together and inhibit breakdown of the dirt clumps. Moisture in the soil, therefore, reduces surface exposure and increases the required aeration time.

#### TEST OBJECTIVES

The Bench-Scale TS tests conducted by Dragun Corporation provided validation for the aeration technology. The objective of the Pilot-Scale field test was to confirm the effectiveness of the final remedial design under actual field conditions. It also enabled identification of any problems with design operations or testing procedures.

#### SAMPLING AND ANALYSIS

Sampling and analysis was conducted in accordance with the Pilot Study Sampling & Analysis Plan (SAP). It essentially consisted of monitoring the progress of the treatment (field screening) and verifying that the soils were sufficiently treated (confirmation sampling).

Field screening for VOCs was conducted with either a PID (Hnu) or FID (OVA) meter. During the initial stages of aerating the

soil, field staff would walk over the aeration area with the meter and check the VOC readings at the soil surface. When it appeared that the readings were approaching the 10 ppm average, samples would be collected for headspace analyses. These samples were collected on about 25 to 40-foot centers. A clean, pint-sized glass jar was filled 1/2 to 2/3 full of the soil sample and a piece of aluminum foil was placed over the mouth of the jar. The jar ring was tightened over the foil and the sample was brought back to the Site trailer. The samples were allowed to adjust to room temperature (approximately 15 minutes to 1.2 hour) prior to taking the meter readings. After adjustment, the meter probe was inserted through the aluminum foil and the readings recorded.

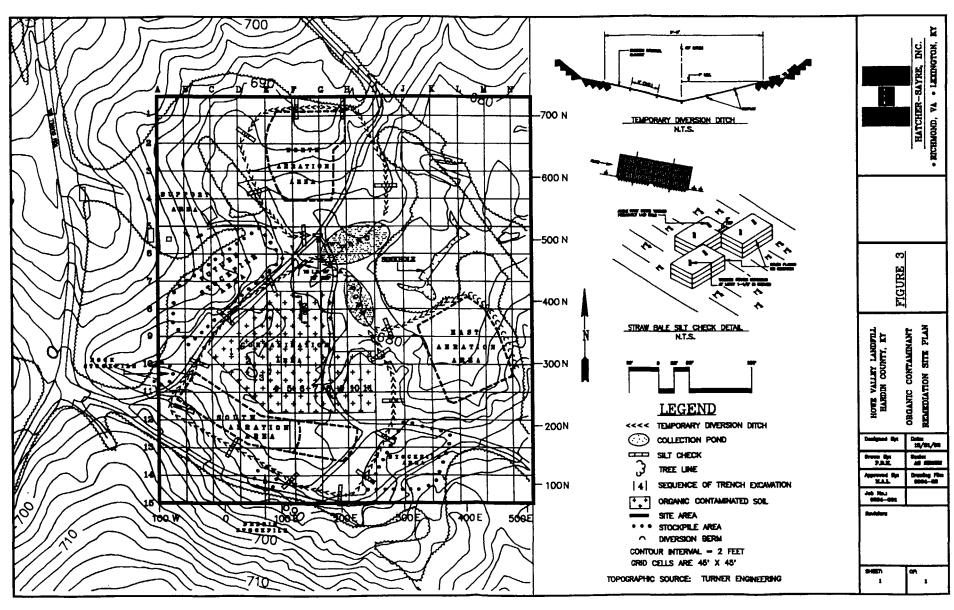
When the headspace VOC readings averaged less than 10 ppm, confirmation sampling was undertaken. These samples were collected with decontaminated stainless steel spoons or scoops at 50-foot centers. The samples were placed in precleaned, laboratory-supplied sample jars so that there was no headspace, labeled, placed in a sealable plastic bag in an ice cooler and sent to the laboratory by overnight mail under chain-of-custody. The aerated soil was stockpiled adjacent to the aeration area until the confirmation results were received. Once the results were obtained and the analyses confirmed that the concentrations were below the SALs, this stockpile was moved to the designated treated soil stockpile.

#### EXPERIMENTAL PROCEDURES AND RESULTS

The Pilot TS was initiated to follow the design and procedures anticipated to be utilized as part of the actual remedial action. The program consisted of two separate phases. Phase I consisted of site preparation and included leveling and preparing the aeration and stockpile areas as well as constructing the drainage areas and collection ponds. Phase II was the actual pilot aeration treatment process. A final phase, which will be implemented following completion of the treatment operations, will consist of leveling, recontouring and revegetating the Site.

The results of the Phase I site preparation activities are shown on Figure 3. The following changes were incorporated into the original design plan. First, the run-on drainage ditches were generally located as designed but some changes were dictated by the topography. In the southeastern area of the Site, construction of the drainage ditch uncovered two intact drums (the investigation and handling of which is addressed separately) resulting in a slight shift in the ditch's location. Due to the discovery of drums and the other debris uncovered during the construction of the ditches, all run-on waters were directed to the ponds rather than to the sinkhole.

Another revision to the Site Remediation Plan consisted of adding a third aeration area. This easternmost aeration area was added when, following several weeks of aerating the soil, it was shown that the high soil moisture content was substantially increasing the treatment time. Since it was taking several days



just to dry the soil sufficiently to adequately break it up prior to treatment, the third aeration area was requested by Dow Corning and approved by EPA.

Phase II, the pilot treatment of contaminated soil on-site, was initiated in stages with soil from the central area of the Site (Figure 3). This area was defined on the basis of concentrations exceeding the proposed SALs for the three contaminants of interest. Generally, the treatment procedure involved excavating the soil, transporting and depositing it in the designated aeration areas and aerating the soil with a rototiller. When the VOC concentrations in the soil were below the SALs, the soil was stockpiled. The detailed treatment method consisted of the following steps:

1. Excavation Areas: The soil requiring treatment is shown on Figure 3 as Areas 1 through 11. The Pilot Study excavation began in Area 1. It continued to bedrock, initially some 4-6 feet below the surface, until sufficient soil was placed on the South Aeration Stockpile (SASP) area. Excavation was then initiated for the second or North Aeration Stockpile (NASP) area. This process was repeated when the treated soil was removed from the aeration areas. Excavation essentially progressed from Area 1 to Area 2 and then to Area 3.

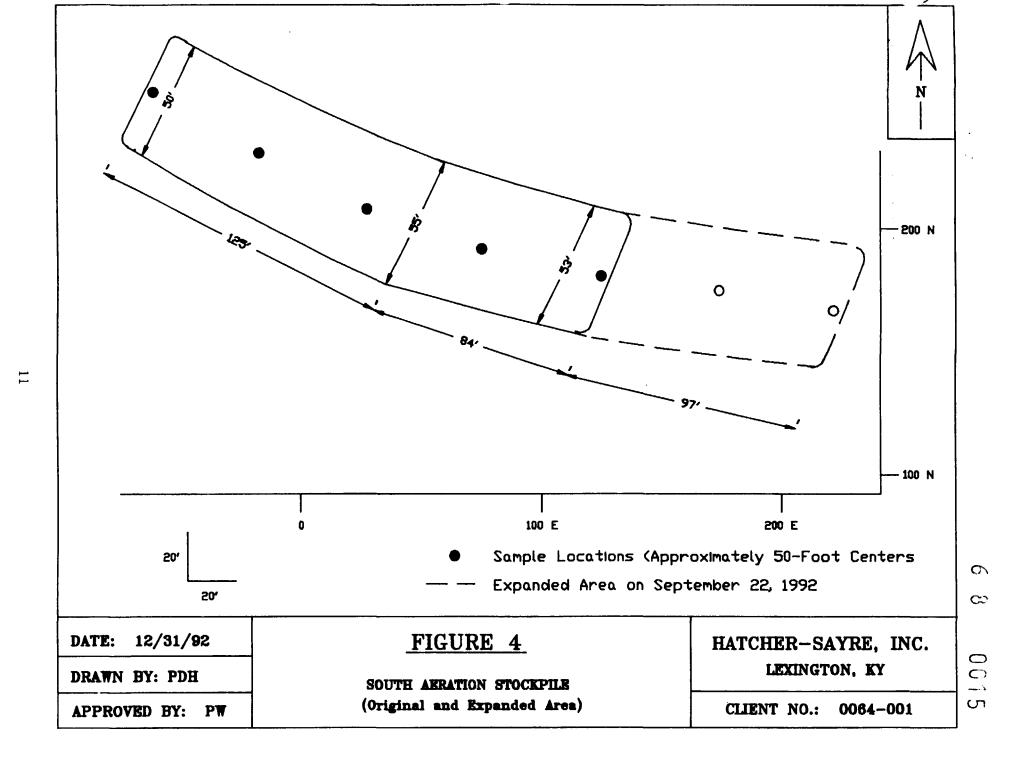
The limestone bedrock in the central area has differentially weathered, producing typical karst features, i.e., deep pockets surrounded by prominences. In the pockets below 8 feet, an organic liquid was encountered (discussed in a separate report). For the Pilot Study, therefore, the excavation depth was limited to about 8 feet. During the first month of the Pilot Study, Areas 1, 2 and 3 were excavated for treatment. The excavated areas were covered with plastic sheets if rain was forecasted.

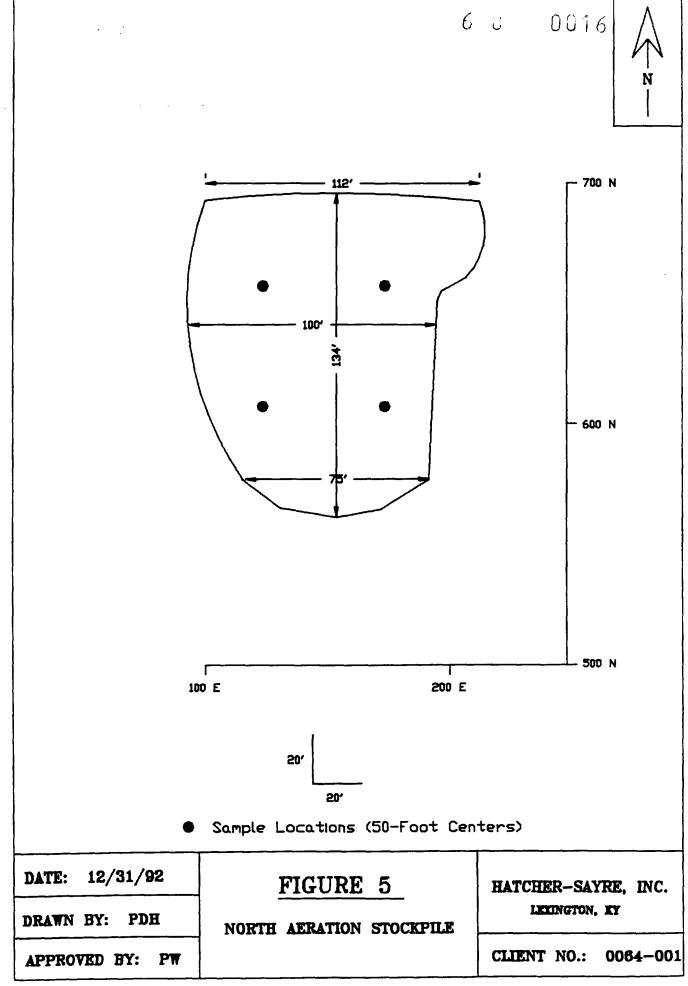
- 2. Soil Excavation: Soil was excavated for treatment utilizing a trackhoe. The trackhoe removed the soil from the trench and loaded it into a tandem dump truck, which hauled and deposited it on the designated treatment (aeration) area (Figure 3). The loader then spread the soil in approximately 6-inch lifts. Technicians sifted through the soil to remove large rocks and debris, e.g., drum lids, silicone tubes or pieces, small containers, etc. A front-end loader was used to move these materials to their respective stockpiles. Substantial stormwater, which collected on the plastic liners in the excavated areas, was pumped to the on-site holding ponds. As approved by EPA, water containing the organic liquid was initially pumped to a 2,500-gallon HDPE temporary holding tank until it was filled to capacity. Subsequent stormwater, which collected in the excavation, prompted a request to EPA for approval to treat the water on-site with a portable activated carbon treatment unit.
- 3. Soil Treatment Aeration: The soil in the treatment or aeration area was aerated continuously using a farm tractor with a rototiller attachment. This procedure breaks up the

clods of contaminated soil, exposes the soil particles to the air which helps dry it out and enhances natural surface evaporation. Initially, the tractor tires were compacting the soil and reducing aeration. To correct this situation, a dozer was used to "windrow" the soil and prevent compaction by the tires.

During the aeration period, VOC screening, using a PID or FID meter, was performed until total organic vapor concentrations Several VOC screening consistently averaged below 10 ppm. techniques were tested during the Pilot Study. During the first week, the PID meter readings were taken at the aeration surface to assess when the aerated soil was approaching the 10 ppm level. Headspace analyses were conducted on the Pilot Study area after the surface testing indicated that VOCs were at approximately 10 ppm. During the end of the second week and the first couple of days of the third week, a hot plate was utilized to warm the soil in the jars for approximately 5 minutes to see if the heat would help drive off the VOCs and increase the meter readings. It had been shown during the 1988 aeration study that PCE, due to its high distribution coefficient (Kd) value, would adhere to the soil so tightly that the headspace analyses would indicate the soil was sufficiently treated (total VOCs were below 10 ppm). Some of the confirmation analyses, however, would indicate that PCE was still above its SAL. To try to drive off the PCE and get a better picture of what concentrations still remained in the soil, it was decided to attempt heating the soil on a hot Heating, however, increased the moisture in the air (humidity) which affected the meters and, therefore, headspace analyses without heating were reinstated. Headspace analyses were performed on all soil aeration areas prior to the taking of any confirmation samples. Although readings were generally not taken until some aeration had occurred, most of the headspace readings which were recorded were below 100 ppm (Attachment 1).

When the readings averaged below 10 ppm, confirmation samples were taken for off-site laboratory analysis for the target compound VOCs. Confirmation samples were collected on approximately 50-foot centers (Figures 4 and 5). A summary of the aeration activities is presented on Table 1. A summary of the preaeration and confirmation sample analyses is presented on Table 2. It should be noted that only three of the confirmation samples were collected from the SASP III on October 23. Half of this area needed to be excavated due to a spongy area which had developed where the equipment was progressively sinking deeper into the ground. The spongy area was the result of wet clayey soil that had to be removed and replaced with dryer soil. The laboratory analyses are appended as Attachment 2. Following laboratory confirmation, the treated soils were redeposited in the Southern Stockpile Storage Area (Figure 3).





## TABLE 1 SUMMARY OF AERATION ACTIVITIES

		SOUTH AERATION STOCKPILE (SASP) I (Batch No. 1 for this location - ≈ 260 cy)
September 15, 1992	-	Initiated aeration on SASP
September 17, 1992	-	Collected 5 confirmation samples; all no detect
		NORTH AERATION STOCKPILE (NASP) I (Batch No. 1 for this location - ≈ 350 cy)
September 21, 1992	_	Initiated aeration on NASP
September 28, 1992	-	Collected 4 confirmation samples; PCE ranged from 0.006 to 0.027 ppm
		SASP II (Batch No. 2 for this location - ≈ 340 cy)
September 29, 1992	-	Initiated rototilling on enlarged SASP; PCE ranged from 8.5 to 19 ppm; 1,1,1-TCA ranged from ND to 0.85 ppm
October 2, 1992	-	Collected 7 confirmation samples (enlarged area); PCE ranged from ND to 0.64 ppm
		NASP II (Batch No. 2 for this location - ≈ 350 cy)
October 3, 1992	-	Initiated rototilling on NASP; PCE ranged from 1.7 to 250 ppm; 1,1,1-TCA ranged from ND to 36 ppm
October 7, 1992	-	Collected 4 confirmation samples; all no detect
		SASP III (Batch No. 3 for this location - ≈ 170 cy)
October 7, 1992	-	Initiated rototilling on SASP; PCE ranged from 11 to 71 ppm
October 23, 1992	-	Collected only 3 confirmation samples due to excavation; PCE ranged from 0.016 to 0.044 ppm

TABLE 1 (continued)

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NASP III (Batch No. 3 for this location - ≈ 350 cy)

October 7, 1992

Hauled excavated soil to NASP; PCE ranged from 14 to 74 ppm; 1,1,1-TCA ranged from 0.52J to 60 ppm; 1,2-DCE ranged from ND to 0.44J ppm

October 26, 1992

Collected 4 confirmation samples; PCE ranged from 0.019 to 0.046J ppm

TABLE 2			6	Я	0019
SUMMARY OF	ANALYTICAL RESULTS	(mg/kg)	U	U	0017

Confirmation Samples	1,1,1-TCA	PCE	1,1-DCA	1,2-DCE
Pilot Study A (Sample 1)	ND	ND	ND	ND
Pilot Study B (Sample 2)	ND	ND	ND	ND
Pilot Study C (Sample 3)	ND	ND	ND	ND
Pilot Study D (Sample 4)	ND	ND	ND	ND
Pilot Study E (Sample 5)	ND	ND	ND	ND
- , -				

## NORTH AERATION STOCKPILE (NASP) I

Confirmation Sa	amples	1,1,1-TCA	PCE	1,1-DCA	1,2-DCE
NASP 1 (Sample	1)	ND	0.006	ND	ND
NASP 2 (Sample	2)	ND	0.017	ND	ND
NASP 3 (Sample	3)	ND	0.027	ND	ND
NASP 4 (Sample	4)	ИD	0.008	ND	ND

## SOUTH AERATION STOCKPILE (SASP) II

Preaeration San	ples	1.1.1-TCA	<u>PCE</u>	1.1-DCA	1,2-DCE
SASP 1 (Sample	•	0.850	19	ND	ND
SASP 2 (Sample	2)	ND	8.5	ND	ND
Confirmation Sa	mples				
SASP 1 (Sample	1)	ND	0.640	ND	ND
SASP 2 (Sample	2)	ND	ND	ND	ND
SASP 3 (Sample	3)	ND	0.330J	ND	ND
SASP 4 (Sample	4)	ND	ND	ND	ND
SASP 5 (Sample	5)	ND	0.330J	ND	ND
SASP 6 (Sample	6)	ND	ND	ND	ND
SASP 7 (Sample	•	ND	0.600J	ND	ND

## NORTH AERATION STOCKPILE (NASP) II

<u>Preaeration Samples</u>	1,1,1-TCA	PCE	1,1-DCA	1,2-DCE
NASP N (Sample 1) NASP S (Sample 2)	36 ND	250 1.7	ND ND	ND ND
Confirmation Samples				
NASP 2 NW (Sample 1)	ND	ND	ND	ND
NASP 2 SW (Sample 2)	ND	ND	ND	ND
NASP 2 NE (Sample 3)	ND	ND	ND	ND
NASP 2 SE (Sample 4)	ND	ND	ND	ND

TABLE 2 (continued)

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### SOUTH AERATION STOCKPILE (SASP) III

Preaeration Samples	1,1,1-TCA	PCE	1,1-DCA	1.2-DCE
SASP 3 (Sample 1) SASP 3 (E) (Sample 2)	ND	71	ND	ND
	ND	11	ND	ND
Confirmation Samples*				
SASP 3A (Sample 1)	ND	0.044	ND	ND
SASP 3B (Sample 2)	ND	0.018	ND	ND
SASP 3C (Sample 3)	ND	0.016	ND	ND

<sup>\*</sup> Only half of the area sampled - other half dug up to firm up spongy area

#### NORTH AERATION STOCKPILE (NASP) III

Preaeration Samples	1,1,1-TCA	PCE	1,1-DCA	1,2-DCE
NASP 3 (N) (Sample 1) NASP 3 (S) (Sample 2)	0.520J 60	14 74	ND ND	0.440J ND
Confirmation Samples				
NASP 3A (NE) (Sample 1)	ND	0.032	ND	ND
NASP 3A (NW) (Sample 2)	ND	0.019	ND	ND
NASP 3A (SE) (Sample 3)	ND	0.038J	ND	ND
NASP 3A (SW) (Sample 4)	ND	0.046J	ND	ND

ND = not detected

J = below detection limit - estimated level

The Quality Assurance/Quality Control data quality objectives (DQOs) for the actual verification of treatment were at Level IV. The field screening methods were Level I. The PID and FID meters were calibrated utilizing instructions provided by the manufacturers. Trip blanks, equipment blanks, intralab spikes and duplicates were collected and are reported with the laboratory data (Attachment 2). All of the trip and equipment blanks were nondetect while the spikes and duplicate samples were within acceptable ranges.

Unfortunately, the state of Kentucky was subjected to one of the highest recorded rainfall years in history. Rain and temperature were recorded at the Site during the Pilot Study. Approximately 3.3 inches were recorded in September; nearly 2 inches in October; and more than 3.5 inches in the first two weeks in November (Attachment 3). Due to the high moisture content and the resulting much slower treatment time, two modifications to the handling procedures were implemented. The first consisted of creating a stockpile next to the excavated area to attempt to predrain the soil prior to rototilling. Second, a third aeration area was established to increase the treatment area and a second rototiller was brought to the Site to expedite soil turnover. These two changes should significantly improve the speed of treatment operations.

#### **HEALTH AND SAFETY**

The Health & Safety Plan for the Pilot TS indicated that the associated risk at the Site is quite low. The projected primary risk source was exposure to select organic contaminants from volatilization from the contaminated soil. Due to the anticipated low associated risk, Level C Protection was stipulated to be utilized initially and upgraded, if necessary and as appropriate. Due to the discovery of the organic liquid in Area 1 below 8 feet, workers in this area had to be upgraded to Level B. The other work areas remained at Level C.

#### SUMMARY AND CONCLUSIONS

A Pilot-Scale TS was conducted at the Howe Valley Landfill Site in Hardin County, Kentucky from mid-September to late October 1992. The study, undertaken subsequent to a successful Bench-Scale TS by Dragun Corporation, was undertaken to confirm its viability under actual field conditions. Secondarily, it was to be used to evaluate the final design plan for remediating the organically-contaminated soil at the Site.

During the nearly 6-week long study, approximately 2,000 cubic yards of soil were successfully treated. As had been indicated in earlier studies, the PCE represented the most difficult contaminant of concern to treat at the Site. The concentration of this

compound, however, was consistently treated below 1 ppm compared to the SAL of >7.5 ppm. All of the other chemicals of concern were consistently below detection.

As the Bench-Scale TS indicated, moisture considerably slowed down the on-site treatment. The moisture tends to "clump" the clayey soils together, thereby reducing the soils' exposure to the air. Unfortunately, the Site experienced one of the highest rainfall years in recorded history. This, along with weekly rainfall during the Pilot Study, substantially increased the need for additional aeration time.

To improve the overall treatment efficiency, stockpiles are being created adjacent to the excavation areas. This is allowing the stockpiled soil to begin drying out prior to being moved to the aeration areas. Additionally, a third aeration area was approved by EPA which will allow more treatment per unit time. In conjunction with this new aeration area, a second tractor and rototiller will be utilized to accelerate treatment.

Overall, the Pilot TS was very successful. Other than the above described changes to improve the efficiency of the operation, the overall Organic Design Remediation Plan should be adequate as proposed.

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ATTACHMENT 1
PID/FID METER READINGS

0026 6 3

	Sheet of			
Project Name:	Date: 9//c/92 Distribution List:			
Sample Location:	C	UA		
Emple K. R. Mar	n / Pweaver S	ampler's initials:	KD	
Reviewer: DWG	m/Pweaver_s	leviewer's inifials:	PW	141. USS.
9-10-92	Cal. OVA TITAL		6-92 (al. 6 Motor Reading (Parts For Million)	Comments
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HATCHER-SAYRE, INC. FID/FID Readings Form					
Project Name:	Have-Valley	Job Numi	0064-001	Date: 9/ K/92	
Sample Location		Nu		Distribution List:	
Sampler: 14. Dur	ham / P. Wewer		· KD		
Reviewer: PW	eaver	Reviewer's initial	PW		
9-10-92 c	al. OVATHUU	9-11	b-92 cal. HN	4.55spm	
J	Sample Taken			Comments	
North 1		2:30	14	SUNFACE SEEDLINGS	
" 3		. (	8		
		11	1		
11 4			<u>2</u> 4		
" 5		\1	2		
11 6		, 1	<u> </u>		
" 4		, (	14		
" 8			12		
middle 1		11	2		
Medio 1			4		
3		11	1		
ч		il.	7		
5		11	8		
6		N	9		
1		(1)	20		
ď		1 (	30		
9		(1	20		
ال		ι(	IO		
South 1		N:			
2		11	1		
3		Ц	2		
4		1(	1,5		
5		11	3		

HATCHER-SAYRE, INC. Sheet 2 of 2  Project Name: Howe-Valley Job Number: 0004-001  Project Name: SASP#1  Distribution List:				
Project Name: -	Houre-Valley	Job Num	ber: 0054-00 l	Date: 9/16/92
Sample Location	1. 5A3P.#F ( H	NJ		Distribution List:
Sampler: K. Dur	ham/P. Woodver	Sampler's inttal	s: KD	
Reviewer: P. W.	laver	Reviewer's initia	PW	1 1/50
1	TI	9-16-	Meter Reading	du 4.55 <sub>5pm</sub>
South c	Sample Taken	Reeding Takes		All reading taken straight
Such 7		11	2	ion creation surface.
South &		\(	3	
		·.		

Project Name: Howe-Valley Job Number: 064-001 Date: 9/16/92 Sample Location: SASPH 1  Distribution List:				
Project Name:	four-Valley	Job Numi	0064-001	Date: 9/16/92
Sample Location:	5/15/# 1	1 1		Distribution List:
		700		
Sampler:	rham/P.wower	Sampler's Initial	: <u>10</u>	
Reviewer: P.W.	aver	Reviewer's initial	PCJ	1150
	cal. OVA &HN	J 9-1	6-92 cal. b	WU 4.5Sspan
Sample #	Sample Takun		Meter Reading (Parts Per Millen)	Comments
North 1		4.00 pm	7	All readings have 5 trught from arealism suface.
2		lı .	1	
3		"	9	
Ч		(1	7	
5		1:	7	
6		I ·	6	
7		ļ :	10	
4		1 #	20	
9		ţ.	5	
10		i,	<u> </u>	
11			17	
رى		' 1	15	
middle 1		( f	15	
2		(1	7	
3		(i	9	
ч		11	30	
5		11	<b>9</b> 20	
Ç		11	20	
7		; 1	70	
8		<i>(</i> \ ,	5	
9		1:	4	
South 1		11		
2		11	8	
3		'\	3	

HATCHER-SAYRE, INC. PID/FID Readings Form Sheet & of 2 Fewe-Vulley Job Number: 0064-001 Date: Sample Location: SASP#1 Distribution List: Sampler: K. Durham / P. Wouver Sampler's Intelais: KD Reviewer: P. Wewer Reviewer's Initials: PW 9-16-92 cal- 4NU 9-10-92 cal. OUA+HNU Motor Reading (Perts For Millen) Time Sample # Comments Booding Take All readings. taken strught South 4:00 pm 3 10 11 11

HATCHER-SAYRE, INC. PID/FID Readings Form Howe-Valley Job Number: 0064-001 Date: Sample Location: SASP# 1 Distribution List: Sampler: K. Dulham / Pwaver Sampler's Intials: KD P. Weaver PW Reviewer's initials: 9-16-92 cal HNU 4-55 300 Span

Meter Reading
(Parts For Million) cal. OVA Time Sample # Comments leading Takes 3,00m North 3:00 22 3:00 North 3,00 25 North North middle. 1 3:00 lO 3:00 North middle 2 middle 1 3:00 middle 3:00 13 2 40 3:00 middle 3:00 middle middle 3:00 4 3:00 9 3:00

6 8 NGK2

	E.D.	ATCHER-SAYR	E INC.	Sheet of
Project Name: Sample Location	Hure-Valle	Job Num	ber: 0064-001	Date: 9/17/92 Distribution List:
Sampler: K. Durham / P. Waver Sampler's Initials: KD  Reviewer: P-Weaver Reviewer's Initials: PW  9-17-92 cal. OVA 300 span 9-16-92				
Sample #	Sample Taken	me Beeding Taken	Matan Bandles I	Comments
North 1	6:00	C:30	7	
11 2	6:00	10	Ç.2	
1, 3	6:00	11	13	
,, 4	6:00	10	10.2	
11 . 5	6:00	н	9.8	
middle 1	6:00	1(	<u> </u>	
11 2	6:00	(1	9.5	
11 3	6:00	V(	8.9	
ц ц	6:00	((	11	
South 1	6:00	11	9	
South 2		11	Ч	
South 3	6:00	, (	7.9	
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		<u> </u>		

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HATCHER-SAYRE, INC. PID/FID Readings Form					
Project Name: Hwe-Valley Job Number: 0064-001 Date: 9/19/92 Sample Location: NASP#1  HNU  Distribution List:					
Sampler: h. Durham/P. wewer Sampler's Initials: hD  Reviewer: P. Wewer Reviewer's Initials: PW  9-17-92 col. OVA 300 span 9-1642 cd. HW 4.555m					
Sample #	Semple Taken	Me Reading Taken	Moter Reading (Parts Per Milles)	Comments	
west 1		4:00	10	All reading taken from a newform surface.	
1. 2		11	38		
, 3		11	18		
11 4		, (	7		
1 5		( (	\$		
middle 1		ι (	3		
11 2		(1	5		
11 3		( (	3		
ر، ۲		( )	1.5		
, 5		1 (	1.5		
( C		( (	2		
1		17	l		
1,		11	1.5		
Past 1		10	0		
2		. (	1.2		
······································					

I		PD Readings	KE, INC.	0 U 3 4 of
Project Name:	Howe Vall	ey Joh Hum	<i>0064-0</i> 0	1 0- 9-2/92
Sample Location	n:	enth area si	iney	Distribution List:
- Du	moor K. Durham	4N'U		•
Sampler: P. C.	NPANEL	— Sampler's Initio — Reviewer's Initio	ile: PW	
9	-17-92	cal. OUA 30	20 sp. 9-	16-92 cal HWY-55 pg
Sample #	Semple Tales	Time Reading Takes	PID Reading	Comments
west	10.00		1.5	south to
side_	10:00			_ /
	10:00		6.0 2.5	V
	10:00		7.0	north
44 44	10:00			
MANE	10:00	<del> </del>	0.0	north 40
	10:00		. 4	
	10:00		•00	4
	10:00		· 2	south
B	10:00			
Fast side	10-00	<del> </del>		south to
SAU F	10:00		. 8	
	10:00		.6	N. 16
				North
	<del></del>			
			<u> </u>	

DATE: 7/24/92

DRAWN BY: PDH

APPROVED BY: JDK

FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC.

LECTION IN

CLIENT NO.: 0064-001

		HATCHER-SAYRI	Form 6 0	Sheet of 003521-92
Project Name: Sample Location:	Date: Distribution List:			
Sampler: K.D.				
Reviewer: P.W.	9 - 16 -	Reviewer's Initia 92 Col. HA Time Residue Tales	Pib Reading	Comments
	6:30	6:45	5/	
WI	6:30	6:45	820	
W2 W3	6:30	6:45	1.3	
MI	6:30	648	17	
MZ	6.30	6:45	14	
<u>n3</u>	6:30	6:45	45	
El	6:30	6:45	lβ	
E2	6:30	6:45	17	
Ē3	6:30	6182	11	
			<b></b>	
	1			
				<u> </u>

DATE:	7/24/92		
DRAWN	BY:	PDH	

APPROVED BY: JDK

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## FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC.

CLIENT NO .: 0064-001

DATE: 7/24/92	FIGURE 4	HATCHER-SAYRE, INC.	
DRAWN BY: PDH	PID/FID READINGS FORM	CLIENT NO.: 0064-001	
APPROVED BY: JDK		CLIENT NO.: OCOT OF	

Project Name:	Howe	PID R	ER-SAYRE, endings F	ower 3	Sheet _ 0 0 3 7 201 Date:	
Sample Location: NASP3  HNU  Sampler: KD & PW Sampler's Initials: KO						Hon List:
Sampler: KD C	Jeani	er Review	ver's initials:	PW		
Sample #		1-24-92 cal	, 07/0 -	PID Readir	Cor	nments
Fast 1	11.2		10	12 m		
East 2	11:3		10	16 pm		
East 3	11:3			1780m		_
wilk!	11:3		10	17 pon		
middle 2	11:3		10	lloon		
mille3		,0 12;	10	46 pm		
west 1	11:3	10 12:	10	20 ppm		
west 2	11.3	,0 12.0	00	36 pm		
west 3	11:3	12:0	0	95 pm		<del></del>
	<u> </u>					
	<del> </del>					
	<u> </u>					
	ļ					
	<del> </del>					
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TE: 7/24/98		FIG	URE 4			SAYRE, IN
PROVED BY: JDK		PID/FID I	PID/FID READINGS FORM		CLIENT NO.	: 0064-0

	1 11		Form 6 8	
Project Name:	Howe- Vall	Job Nun	nber: <u>0004-001</u>	_ Date: <u>\$/ 25/92</u>
Sample Location	. North area	fion		Distribution List:
		HNU		
Sampler: K	terham	Sampler's Initia	als: <u>KO</u>	
Reviewer: D. W	gaver	Reviewer's Inttle 92 cal. H.	ols: PW	
	9-29-	92 cal- 4.	No 3.555pan	<del></del>
Sample #	Sample Taken	Time Reading Taken	PID Reading (Perts Per Miller)	Comments
North oust	5:30	5:50	8 mm	all four head of griddle.
North west	£.30	5:5c	13ppn 2ppn 22ppn	
South east	5;30	5:50	2 pp	
South wood	5,30	5:80	32 610	ļ
			<u> </u>	<u> </u>
			<u> </u>	
				<u> </u>
	<u></u>			
TE: 7/24/92		FIGURE	4	iatcher-sayre, inc

DRAWN BY: PDH

APPROVED BY: JDK

PID/FID READINGS FORM.

LEXINGTON, EY

Project Name:	-buc-Vo	PID Readings	Form 8	Sheet of 0039 pl Date:
Sample Location	Norgh	HN17		Distribution List:
Sampler: K Durk Reviewer: P. W	ram P. W. Paner 1	Reviewer's Initia  -24-92 cal, HN	HE KD	<b>N</b>
Sample #	Bemale 1	Time	PID Reading	5 Comments
East 1	8:10	8:25	12	All (11) samples handed on gridde by & min.
East 2	8:10	8:25	25	
middle 1	8:10	8:25	17	
middle 2	8:10	8:25	20	
middle 3	8:10	8:25	41	
middle 4	8:10	8:25	67	
uest 1	8:10	8:25	80	
West 2	8:10	8:25	68	
wst 3	8:10	9:25	60	
west 4	8:10	8:25	53	
West 5	9:10	9:25	78	
	<del> </del>		-	
	<del> </del>		<del> </del>	
TE: 7/24/98		FIGURE	4	HATCHER-SAYRE, INC
PROVED BY:	JDK	PID/FID READING	FORM.	CLIENT NO.: 0064-00

iampier: /i- Dul	MAY / WLTUE		LT J	
leviewer:	)eaver	Sampler's intition	ple: $p\omega$	
Sample #	1-2	4-07 11 41	PID Reading	Comments
Jes 1	11:30	11:45	90	All taken after
iest 2	11:30	11:45	21	Balacanyliagia
Jest 3	11:30	11:45	20	
vest 4	11:30	11:45	23	
niddle 1	11:30	11:45	16	
niddle 2	11:30	11:45	10	
riddle 3	11.30	11:45	17	
niddle 4	11:30	11:45	17	
ast 1	11:30	11:45	25	
ast 2	11:30	11.45	7.4	
ast 3	11:30	11:45	12	
East 4	11:30	11:45	10	
ack ground	11:30	11:45	٠٠	
est glass	W:30	11:45	0	,
		<del>-</del>		<del></del>
		ł		

DATE: 7/24/92

DRAWN BY: PDH

PID/FID READINGS FORM

CLIENT NO.: 0064-001

	1	HATCHER—SAYR PID Readings	E, INC. Form 6 8	Sheet of _ 1 0 0 4 1 9/29/92		
Project Name: Sample Location	Project Name: Howe-Valley Job Number: 0064-001 Sample Location: North greation grea  HN12					
Sampler: K. Du. Reviewer: P. U.						
Sample #	Stenole Talous	ime Beeting Taken	Pil) Reading	Comments		
west 1	12:45	1:00	10	Griddle not used.		
west 2	12;45	1:00	8			
west 3	12:45	1:00	7.5			
west 4	12:45	1:00	16	<del> </del>		
middle 1	12:45	1,00	15			
middle 2	12:45	1.00	24			
middle 3	12:45	1:00	/3			
middle 4	12:45	1:00	17			
East 1	12:45	1.00	30	<u></u>		
East 2	12:45	1:00	24			
East 3	12:45	1:00	35			
East 4	13:45	1:00	14			
		-				
				<b>2</b> 40.1		
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	1	1				
	<del>                                     </del>					

DRAWN BY: PDH

APPROVED BY: JDK

FIGURE 4

PID/FID RRADINGS FORM

HATCHER-SAYRE, INC.

LEXINGTON, EY

Project Name: -	-bwe - Valle	ATCHER-SAYR PID Readings	Form 8 0	Sheet — of 0 4 2 Date: 9-28-97
Sample Location	. North area	tion great		Distribution List:
- K]	Durhan		kD	
Reviewer: P.W.	raver	Reviewer's Intitle	PW PW	
Sample #	4-64-42	me Bredler Tabon	PID Reading	Comments
South wont	G 5: 20	5:35	10.4	
North west	5:20	5:35	9.1	
North east	5:20	5:35	7.9	
South east	5:20	5:35	5.7	
			<u> </u>	
		<del>                                     </del>		
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DRAWN BY:

FIGURE 4

HATCHER-SAYRE, INC.

LEMMOTON, XY

JDK APPROVED BY:

PDH

PID/FID READINGS FORM

	H:	atcher Ind PID Readi	corporated ings Form 6 8 Number: <u>0069</u> -	Sheet Lof 1 00439-30-92
Project Name:	Howe Va	Mey Job	Number: <u>0069</u> -	001 Date: 7-30-72
nple Location	on: <u>SASP</u>	) '		Distribution List
Sampler: <u>F- W</u>	San G	nplers Signatur 2-24-92 <u>cal</u> .	e: P. Wann HDJ 3.55 spn	
Sample #		Me Reading Taken	PID Reading (Parts Per Million)	Comments
North 1	3:15	3:45	34	
2	3:15	3:45	58	
3	3:15	3:45	66	
4	3:15	3:45	56	
Middle 1	3:15	3:45	6/	
2	3:15	3:45	74	
3	3.15	3:45	60	
4	3:75	3:45	56	·
th 1	3.15	3:45	30	
2	3:15	3.45	24	
3	3:15	3:45	43	
4	3.15	3:45	64	
· · · · · · · · · · · · · · · · · · ·				
	1	l	1	•

HATCHER-SAYRE, INC. PID/FID Readings Form 6 8 0044						
Project Name: -cwe-Valley Job Number: 0064-001 Date: 10/1/92						
Sample Location	Sample Location: South areation area					
	<u> </u>	NJ				
Sampler: K. D.	a 1 ham / P. Wenuc	Sampler's initial	18: <u>KD</u> .			
Reviewer: P.W.	<u>Paner</u>	. Reviewer's initia	In: PW			
	9-24.	-92 cd. HN	3-55 span   Motor Reading			
Sample #		me Besting Taken	(Perts Per Milles)	Comments		
North	10:35	10:55	26,,,,			
North 2	10:35	10:55	27 m			
North 3	10:35	10:55 10:55	4/1pm			
middle 2	10:35	10:55	30 spm			
middle 3	10:35	10:55	33			
South 1	10:35	10:55	9			
South 2	10:35	10:55	21			
south 3	10:35	10;55	19			
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		·				
			<u> </u>			
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		<u> </u>	<del> </del>			

	חס	ATCHER-SAYR )/FID Reading	R Form	Sheet of
Project Name:	Howe Valle	Job Numl	ber: <u>C064-001</u>	Date: 10/1/92 Distribution List:
Sample Location	Distribution List:			
ν Λ <i>Ι</i>	HNC		K i )	
Sampler: 1 14rt	an- I P. Weuver	. Sampler's Initial . Reviewer's Initial	$\mathcal{P}_{I_{2}}$	
Reviewer: 1.00	raver 0	Reviewer's Initial	10: 100 m	
	9-19 1 <b>11</b>	-92 cal- H	No 255par Meter Reading	Commonts
Sample #		Beading Taken		Comments
North 1	11.15	11:30	57	
North 2	11:15	11:30	75	
North 3	11, 15	11:30	90	
middle 1	11:15	11:30	34	
middle 2	11:15	11'30	64	
middle 3	11:15	11:30	100	
South 1	11:15	11:30	28	
South 2	11:15	11:30	49	
South 3	11:15	11:30	62	
	<del> </del>			
	<b></b>			
			-	

HATCHER-SAYRE, INC. PID/FID Readings Form Project Name: Howe - Valley Job Number: 0064-00/ Date: 10/1/92 Sample Location: #SASP \_\_\_\_ Distribution List: Sampler: h. Duham / Weave/ Sampler's Initials: KD Reviewer: P. Weaver Reviewer's Initials: PW 9-24-97 cal. HNU 3.55 spen Time Beading Taken Meter Reading (Parts Per Millen) Sample # Comments Sample Taken North 1 **35** 2:50 3:10 3.1c North 2'50 34 3.10 North 2.50 20 2:50 3:10 North 22 3:10 22 North S 2:50 3:10 2;50 middle 2:50 3.)0 middle 50 middle 3 2:50 25 3.10 2:50 36 middle 3:10 3:10 2:50 37 2:50 3:10 17 3:10 2:50 South 2 18

	H. PID	ATCHER-SAYRI O/FID Reading	e Warth	Shoot 1 of 2 of 2 of 47
Project Name:	Have-Valley	•	′ (	Date: 10/1/92
Sample Locations	: 5,75° 4.N.			Distribution List:
Sampler X Du		Sampler's initials	* KD	
		. Sampiers inmai: . Reviewer's initial		
	9-24.	-92 cal- HN	10 3.55 spm	
Sample #	Sample Taken	me Beading Taken	Meter Reading (Parts Per Million)	Comments
North 1	6:30	6;45	12	
North 2	C:30	6:45	21	
.North 3	c;30	6:45	17	
North 4	C:30	6:45	20	: 
North 5	C:30	C; 45	19	
middle 1	6,30	6:45	19	
middle 2	6;30	6:45	39	
meldle 3	£130	6:45	12	
middle 4	Q:30	6:45	19	
mildle 5	£136	c:45	10	1.
South 1	6;36	6:45	n	
South a	¢. 30	C:48	12	
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	PID	ATCHER-SAYRI	s Form	Sheet of	
Project Name: — Sample Location:	Project Name: Howe-Valley Job Number: 0064-001				
		OVA	KO		
Sampler: K. Duth	no / V Weaver	Sampler's intial	$\frac{KD}{D(U)}$		
Reviewer: 1-40	ALL DIA 300	Reviewer's initial	2.09 Span		
Sample #	Tis Sample Taken	me Beeding Taken	Meter Reading (Parts Per Million)	Comments	
North 1	7:00	7:15	11	using OVA Grall.	
North 2	7:00	7:15	11		
North 3	7:00	7:15	C ·		
North 4	7:00	7:15	99		
middle 1	7;00	7:15	5		
middle 2	7:00	7:15			
middle 3	7:00	7:15	G		
middle 4	7,00	7:15	7		
South 1	7:00	7:15	5	· ·	
south 2	7:00	7,15	-		
	<del> </del>				
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	<del> </del>		<del>                                     </del>		

	PID	ATCHER-SAYR	s form K o	Sheet of
Project Name:	lowe-Valley	Job Num	0064-001	Date: 10/2/92  Distribution List:
Sample Location	: <u>NASI.</u> 141	U tova		
<u> </u>	rm/P. weaver		· KP	
· ·	ower			
<b>7</b>	- cal. Ov4 3		14	
Sample #	Sample Taken	me Beating Taken	Meter Reading (Parts Per Miller)	Comments
North 1	G:40	G:55	16	Using OVA
North 1	6,40	C;55	20	Using Hnu
North 2	6,40	6:55	27	OVA
North 2	6:40	C;55	54	Hnu
North 3	¢:40	G:55	22	OU A
North 3	G: 40	G;55	39	Hnu
middle 1	C:40	C:55	10	OVA
middle 1	C: 40	ciss	24	Hnu
middle 2	G:40	6:55	25	OVA
middle 2	C:40	<b>6</b> :55	44	Hnu
middle 3	C : 40	6:55	70	ov4
middle 3	Citto	c:55	62	Hnce
south 1	6,40	6:55	20	CUA
South 1	G: 40	G: 55	24	Hnu
South 2	c:40	c : 55	12	OUA
South 2	6:40	C:55	19	Hnu
South 3	C; 40	c ; 55	14	OVA
south 3	C:40	c:55	27	Hnu
		· · · · · · · · · · · · · · · · · · ·		
·				

	PI	IATCHER-SAYF D/FID Reading	gs Form	Sheet of
f Project Name: .	Howe-lalley	Job Num	ර යි  ber: අ <u>ගරේ -ගර</u> ්	0 0 5 p/2/92
Sample Location	: 4 South on	ention area		Distribution List:
		<u>H</u>	·	
Sampler: K. Da	shample weaver	Sampler's Initia	Is: KD	
Reviewer: 1-WE	aver	. Reviewer's initia	Is: PW	
10-2-9	2 cal OVA	Span 300 H	Notes Resiling	
			(Perte Per Million)	Comments
North 1	7:00	7:15		
North 2	7.00	7,15	1	
North 3	7:00	7:15	C	
North 4	7:00	7:15	19	
middle 1	7:00	7:15	5	<del> </del>
middle 2	7,00	7:15	<del></del>	
middle 3	7:00	7.75	6	
middle of	7:00	7.15		
south 1		7:1S	5	
South 2	7:00	(113	3	
		<del> </del>		
		<del> </del>	<del> </del>	
			<del> </del>	· · · · · · · · · · · · · · · · · · ·
				<u> </u>
1				

	P	HATCHER-SAY D/FID Readin	RE, INC.	Shoot of
Project Name:	lowe-Valley	Job Nu	mber: OCC4-001	Date: 10/5/92
Sample Location	: <u>NASP</u> HN	<u> </u>	Α	Distribution List:
	M/P. Weaver	Sampler's initi		
	5-92 Cal	Reviewer's initi	lale: PW 2.3 mm	
	Sample Taken	Time Reading Taken	Meter Reading (Parts For Milles)	Comments
North 1	12:10	12:25	35	
North 2	12:10	12,25	38	
North 3	12:10	12:35	60	
North 4	12,10	12:25	31	
middle 1	12:10	12:25	19	
middle 2	12:10	12:25	36	
mildle 3	12:00	12:25	33	
middle 4	12:10	12:25	39	
South 1	12;10	13.25	23	
South 2	12:10	12:25	24	
South 3	12:00	12:25	1.12	
South 4	13.10	12,25	10	
	<u> </u>			
<b></b>				
		<u> </u>		
		<del> </del>		
1	t			

	H PII	ATCHER-SAYRED/FID Readings	Form 6 8	Sheet of
Project Name: —	Home Valle	Job Numb	er: <u>0069-801</u>	Sheet of 0 0 5 10 -5 - 22 Date: Distribution List:
Sample Location:	#	1/17		
D.1	4100.00	complete initial	: PW	
17 ( , 18	CANYS	Kedlemet 2 timing	-	
10-5-°	77 ('a). ( )u		Motor Reading (Pests Per Miller)	Comments
	Sample Taken	Boading Taken	(Peris Fix	
North 1	3:00	3:75	30	
North 2	3:00	3:/5	3	
Marth 3	3:00	3:15	3/0	
North 4	3:00	3:/5	32	
usddle!	3:00	3:15	27	
Middlez	3:00	3!15	50	
Middle >	3:00	3.75	<b>  #5</b>	
Ushle 4	3:00	3:15	32	
South 1	3:00	3:15	17	
South 2	3:00	3:15	29	
South 3	3:00	3:15	22	
South 4	3:00	3:15	23	
		ķ		
		<u> </u>		

Ţ		ATCHER-SAYR		Sheet of
Project Name:	lowe-Valley	Job Num	ber: 0064-0c/	Date: 10/5/92
Sample Location	. NASP			Distribution List:
K Dev	hum/P. Wenue/		KO	
	lave			
· P	5-92 cal. Cu	JA 300 50gm	HNU 33 span	
Sample #	Sample Taken	me Reading Taken	Meter Reading (Parts Per Milles)	Comments
North 1	5:00	5,20	15	
North 2	5:00	6:20	22	
North 3	5:00	5:20	26	
North 4	5:00	5:20	27	
middle 1	5:00	6:20	22	
middle 2	5:00	5:20	18	
middle 3	8:00	5:20	24	
middle 4	5:00	2:30	22	
South 1	ς;60 = 1.00	5:20	15	
South 2	5:00	5:20	15	
South 3	5:00	€;20	10	
south 4	S:00	<b>6</b> :20	10	
				<del></del>
		·		
<u> </u>				

	H.	atcher Inc PID Readi	corporated ings Form 6	Sheet Lot L 8 0056-6-82		
Project Name:	Distribution List					
iple Locati	Project Name: Howe Valley Job Number: 0064-001  1ple Location: NASP  HNU					
<b>5</b>			DI			
Sampler: P.W.	Sar	nplers Signatur	e: PWeaun HNU-pon 23 PID Reading			
Sample #	Til Sample Taken	Me Reading Taken	PID Reading (Parts Per Million)	Comments		
North !	7:35		12			
2	7.35		68			
3	7:35		40			
4	7:35		21			
Middle 1	7:35		8.5			
2	7:35		19			
3	7:35		28			
4	7.35		21			
· 4 1	7:35		6			
2	7.35		7			
3	7:35		9			
4	7-35		10			
	:					
(						

1	H. PID	ATCHER-SAYRI FID Reading	E, INC.	Sheet of
Project Name:	Howe-Valle NASP	Job Num	ber: 0064-001	Date: 10/6/92 Distribution List:
	1 61 13			
Sampler: K. V.	iham/f, Weara	Sampler's initial	s: <u>hV</u>	
Sample #		me Beeding Telen	Moter Reading	Comments
North 1	1:30	<b>3</b> . 00	21	
North 2	1,30	2:00	35	
North 3	1:3e	2:00	36	
North U	1:30	2;00	39	
middle 1	1:30	0,00	1.5	
middle 2	1:30	2.00	40	
middle 3	1:30	2;00	39	
middle 4	1:30	2:00	26	
300th 1	1:30	2:00	1/	· · · · · · · · · · · · · · · · · · ·
south 2	1:30	2:00	30	<u> </u>
South 3	1.30	2:00	11	
South 4	1:30	2,00	9	

## PID Readings Form 8

Sheet <u>fof\_f</u>

0056 Date: 10-6-82 Project Name: Howe Valley Job Number: 0064-001 Distribution List ிmple Location: \_\_\_

Sampler: P. W. Caver Samplers Signature: P. W. Caver Samplers Signature: P. W. Caver Span HNU 2.3 span HNU 2.3 span HNU 2.3 span Comments					
Sample	#	Tir Sample Taken	Ne Reading Taken	PID Reading (Parts Per Million)	Comments
North	1	6:20	6:30	13	
	٧	6:20	630	13	
	3	6:20	6:30	i0	
	4	6:20	6:30	19	
Midale	ĺ	6:20	6:30	6	
	2	6:20	6:30	6	
	3	6:20	6:30	8	
	4	6:50	6:30	フ	
- wh	ſ	6:20	6:30	2	
	ک	6:50	6:30	Ч	
	3	6:20	6:30	4	
	4	6:20	6:30	3	
	<del></del>				

6 8 0657 HATCHER-SAYRE, INC. PID/FID Readings Form Project Name: 1-lawe - Valle y Job Number: 0064-001 Distribution List: Sample Location: NASP HNO Sampler: M. Durham/K Beyley Sampler's Intials: KD Reviewer: P. Weaver Reviewer's Initials: PW 10-7-92 Cal. OUR 300 Span HNU 2.3 Span

Moter Reading
(Parts Per Miller) - Comments Semple Taken Sample # 8:30 am 7:30 a.m North 1 North 2 11 11 North 4 11 11 middle 1 " " middle 11 ,, middle 11 11 middle 4 11 ,, 11 South 2 11 11 South 3 11 11 5017h 4

DATE: 7/24/92	FIGURE 4	HATCHER-SAYRE, INC.	
DRAWN BY: PDH  APPROVED BY: JDK	PID/FID READINGS FORM	CLIENT NO.: 0064-001	

1	1	HATCHER—SAYR PID Readings	Form 6 8	Sheet of 0 0 5 9 Date: 19/12/92
Project Name:	SASP-#.	<u> </u>	0064-00 I	Distribution List:
P.W	tham eaver	Sampler's inition Reviewer's inition  3005pen Hi	ale:	
/⇔-/.2 Sample #	Secole Takes	Time	PID Reading	Comments
North 1	2:00	2:35	31	
Nurth 2	(1	(c	49	
Nurth 3	11	(C)	40	
lorth 4	((	C C	44	
middle 1	η	")	35	
middle 2	((	((	45	
middle 3	«	((	46	
middle 4	رد	(1)	53	
South 1	((	- (	30	
South 2	((	(1)	22	
South 3	te	,	32	
South 4	11		134	
	<del> </del>			
	<u> </u>			
	<del> </del>			
	-			
	+			
	<del>                                     </del>			
	+			

DATE:	7/24/91	2
DRAWN	BY: PD	H
APPRO	VED BY:	JDK

FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC.

	F	HATCHER—SAY	RE, INC.	Sheet of
Project Name: -	Howe Valley		mber: Off-001	0060 Dates 10/12/92
Sample Location	SASV-3			Distribution List:
	<i>_</i>	IN U		
Sampler:	ampad Brale	Sampler's Inffi	ols:	
Reviewer: P.W4	aver	_ Reviewer's Initi	als: PW	
	-95 Cal.	Time	PID Reading (Parts For Million)	Comments
Sample #	4:45	5:10	52	Commence
North 2	11	11	21	
North 3	[(	11	18	
North 4	11	11	17	
middly 1	1(	11	26	
middle 2	()	' (	16-	
middle 3	11	1	32	
middle 4	10	((	2/	
South 1	(1	1,	24	
South 3	1,	`(	125	
SU14 3	11	1 ,,	20	
)		<u> </u>	-	
		<del> </del>		
	<u> </u>	<del> </del>		
		<del> </del>		
		<del> </del>	+	

DRAWN BY: PDH

APPROVED BY: IDK

FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC.

	H	ATCHER-SAYR PID Readings	<b>-</b> / ()	Sheet of
Project Name:	1 towe - Vul	Job Num	DOGY-001	Date: 10/12/92
Sample Location	NASP-3	1		Distribution List:
	FW U			
Sampler: Dirih	m/Parl Brokey	. Sampler's initial	PW	
B	leaver _		·	
Sample #	- 92 Ca(.	DUA 300 300  Beeding Taken	PID Reading	Comments
North 1	4:45	5:05,	<b>3</b> 20	11 d hole in Jer.
North 2	14	- 11	25	
North 3	(1	je .	39	
North 4	10	μ	29	
middle 1	١٠	· · · · · · · · · · · · · · · · · · ·	42	
middle 2	11	11	42	
mulde 3	I,	11	45	
middle 4	11	1.	<b>3</b> 29	
South 2	1,	1	20	
South 2 South 3	11	X <sup>1</sup>	24	
Couth 4	10	11	28	
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
			<del> </del>	
	<b></b>			

DRAWN BY: PDH

APPROVED BY: JDK

FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC.

LEMMOTON, KY

<u> </u>	П	ALCITET THE PID Readi	ngs Form	Sheet Lot /		
Project Name: Howe Valley Job Number: 064-001 Date: 10-13-92  Sample Location: 5487#3 Distribution List						
Sample Locati	on:	8p#3		Distribution List		
<del> </del>		14104		6 - 8 - 0 0 6 2	-	
Sampler: $\frac{p_1}{p_2}$	Veaver_san	nplers Signatur D <i>UA 300 sp</i> oo	e: P. Weaver		-	
Sample #	l Tis	Ne Reading Taken	PID Reading (Parts Per Million)	Comments		
North 1	11:15		21			
2	11-15		23			
3	11-15		1			
Ч	16:15	· · · · · · · · · · · · · · · · · · ·	11			
Middle (	11-15		14			
7	11:15		12			
3	11:15		11			
4	11:15		15			
Smith 1	11:15		34			
2	11.15		11			
3	11-15		13			
4	11:15		10			
<del></del>						
					<del></del>	
	<u> </u>		<u>.                                    </u>	<u>L </u>		

PID Readings Form					
Project Name:	Hove Va	le Job		00/ Date: 10-13.92	
Sample Location	on:	54#3		Distribution List	
	,	•		6 8 0063	
		nplers Signatur			
Sample #	Tir	Ne Reading Taken	PID Reading (Parts Per Million)	Comments	
North 1	2:00	2:35	31		
2	"	"	41		
3	()	٦	40		
4	(r	9	44		
Middle 1	4	11	35		
2	4	<i>'</i>	45		
3	4	"	46		
9	i	4	53		
South 1	1	"	30		
2	4	1	22 .		
3	1,	4	25		
4	7	9	32		
-	-				
`					
				· · · · · · · · · · · · · · · · · · ·	
				•	

DATE:	7/24/92

DRAWN BY: PDH

APPROVED BY: JDK

## FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC. LEXIDIGION, EY

60 d

	HA PID	TCHER—SAYRI /FID Reading	s rorm	Sheet of
Project Name: L Sample Location:	NADIA3		0664-001	Date: 10/14/92 Distribution List:
	* 1	NO	1/10	6 8 0066
Sampler: 1. Day	rham	Sampler's Initial	la: Ky	
D.W	caver	Reviewer's Initia		
10-14	192 Cal. OUI	me Beeding Taken	Moter Reading	Comments
Sample #		2:15	85	
North 1	2:00	11	25	
11 2	1 (	.(	89	
11 3	1 (		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-
1( 4	. (	(,	75	
middle 1	1(	<del> </del>	80	
2	: (	11	10.5	
., 4		ι (	90	
South 1	( (	\(	80	
11 2	((		96	
11 3	( (	( '	100	
1, 4	1(	(*	100	
			100	
		-		
			·	

		PI	HATCHER-SAYRE ID/FID Readings	s Form	Sheet of
Project Nan Sample Loc	ne: ∠ :ation:	Howe - Vall	Job Numb	D84-001	Date: 10-14-92 Distribution List:
Sampler:	al	Bagley	Sampler's initial:	10t	6 8 0067
/o-	-14-	92 cal. C	JUA 300 Spon A	(Perts Per Mines)	Comments
	<del>"</del> ,	2:00	2:20	115	
North		4	4	110	
- //	2	u	el .	92	
11	3	11	ч	80	
Middle	<u> </u>	"	(1	101	1
MIDDE	2	4	4	110	
,,	3	У	4	100	
11	4	1	и	104	
South		Λ	6	115	
"	2	4	q	75	
10	3	5	4	108	
/*	4	ધ	4	60	
		ļ		1	
1		<u> </u>			

	Sheet_lof_/ Date: 10-15-92					
Project Name:	Project Name: Howe Valley Job Number: 0064-001  Sample Location: 545P#3					
Sample Location	on: 5/5P.	#3	Number.	Distribution List		
		70		— <del>6 8 0068</del>		
Sampler: K.T	Sar Sar	mplers Signatur	e: KDenhan HNU 2.3 span			
Sample #	l Ti	Me Reading Taken	PID Reading (Parts Per Million)	Comments		
North 1	12:30	1500	60			
2	11	ľ	80			
3	"	(r	40			
4	le	4	51			
Middle!	4	п	75			
2	4	ч	70			
3	(,	7	72			
d	1.	9	65			
South 1	"	9	63			
2	r,	:	45			
3	9	7	56			
4	1	r	53			
<u></u>						
				· · · · · · · · · · · · · · · · · · ·		

Sample   Location:   SASP H 3			ATCHER—SAYR PID Readings		Sheet of
Sampler: (1) Boyley Sampler's Infficient PW    10-19-92 Cal. OVA 30c and HNU 7355024    Sample # Secret Tables   PW   PW   PW     North 1 2 3c 2:45   13   Comments     North 2 2 3c 2:45   59     North 3 2 3c 2:45   65     North 4 2 3c 2:45   65     North 5 2 3c 3c 3:45   65     middle 1 2 3c 2 3c 3:45   55     middle 2 2 3c 2 45   57     middle 4 2 3c 2 3c 3 45   57     middle 4 2 3c 2 3c 3 45   57     middle 4 2 3c 3c 3 45   57     middle 5 2 3 3c 3c 3 45   57     middle 6 3 3c 3	Project Name:	towe - Valle	Sy lab Nord		
Sampler: (a) Bayley Sampler's Intitals: PW    North 2   23c   2145   13     North 3   23c   2145   65     North 4   23c   2145   65     North 5   23c   2145   65     North 6   23c   2145   65     North 7   23c   2145   65     North 8   23c   2145   65     North 9   23c   2145   65     North 1   23c   2145   65     North 2   23c   2145   65     North 3   23c   2145   65     North 1   23c   245   65     North 2   23c   245   55     North 1   23c   245   55     North 1   23c   245   55     North 2   23c   245   55     North 1   23c   245   57     South 1   23c   245   57     South 2   23c   245   57     South 3   23c   2	Sample Location:	4,	US		
Sample     Time   PD Reading   Comments     North 1	Reviewer: P.W	Begley Pawer	Sampler's initial	PW	
North 1 23c 245 13  North 2 23c 245 69  North 3 23c 2;45 60  North 1 23c 2;45 65  North 1 23c 2;45 65  Modle 1 23c 2;45 65  modle 2 23c 2;45 55  indule 2 23c 2;45 57  Guth 1 23c 2;45 84  Sixth 2 23c 2;45 35  ixth 3 2:3c 2;45 24		-92 cal.	OVA 300 A	PID Reading	
North 2 2.3c 2:45 59  North 3 23c 2:45 60  North 4 2.3c 2:45 65  moder 1 2:3c 2:45 65  indele 2 2:3c 2:45 55  indele 2 2:3c 2:45 57  Guth 1 2:3c 2:45 57  Guth 1 2:3c 2:45 59  Sixth 2 2:3c 2:45 35  ixth 3 2:3c 2:45 24		Sample Talues	Reading Taken	(Perte Per Miles)	Commence
North 3 230 2:45 CO  North 4 2.30 2:45 S4  mode 1 2:30 2:45 S5  index 2 2:30 2:45 S5  index 4 2:30 2:45 S7  Guth 1 2:30 2:45 S4  Suff 2 2:30 2:45 S4	North	7 30			
Noth 1 2.30 2.45 65  middle 1 2.30 2.45 65  iniddle 2 2.30 2.45 55  iniddle 2 2.30 2.45 57  Gush 1 2.30 2.45 59  Sud 2.30 2.45 59  Sud 2.30 2.45 35  ixth 3 2.30 2.45 24					
midle 1 2 30 2.45 65  midle 2 2 30 3:45 55  indile 3 2 30 2 45 75  indile 4 2 30 2 45 57  Gal 1 2 30 2:45 51  Sud 1 2 2 30 3:45 35  ixth 3 2 30 2 45 24			1		<del></del>
indico 2 330 3:45 55 indico 2 330 245 75 indico 2 30 245 75 indico 2 30 245 57 Guh 1 2 30 2:45 54 5xx 12 2:36 3:45 35 ixx 1 3 2:30 2:45 24					
indile 3 2.30 245 75 indile 4 2.30 2.45 57 Gulf 1 2.30 2.45 84 5xx 12 2.30 3:45 35 ixx 1 3 2.30 2.45 24					
inided 230 2.45 57  4 2 1 2 30 2.45 54  5 2 1 2 2.30 3:45 35  1 2 3 1 2 2 3 2 2 4					
4 3h 1 2 3c 2 45 84 5 2 1 2 2 3c 3 45 35 1 2 3 2 3 C 2 45 24					
5x412 2.36 3:45 35 1x4h 3 2:36 2:45 24				84	
1x sh 3 2:30 2:45 24	51/12	2.34	3:45	35	
	ix th 3	J 6,0	245	.24	
		9 36	2:45	C5	
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			ļ		
				<u> </u>	
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					<u> </u>
				<del> </del>	
والمراب المستقل والمراب والمستوا والمستوان والمستوان والمستوان والمستوان والمستوان والمستوان والمستوان والمستوان		<u> </u>	1	<u> </u>	<u> </u>

DRAWN BY: PDH

APPROVED BY: JDK

FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC.

LEMBOTON, EY

	1	ATCHER-SAYRE PID Readings B	orm.	Sheet of
Project Name:	we-Valley	Job Numb	00(1-001	Date: NU/19/9-3 Distribution List:
Sample Location:	N/3/# 3~			<del>6 8 007</del> 0
Sampler: KDU	. Thum	Sampler's initials Reviews initials	KO	
Reviewer: P.W.	raver	Reviewed a Infillation	1/4/1 775	- 004
10-19-7 Sample #	92 Cal. C	IME Tables	PID Reading (Parts Per 1886s)	Odming-
North 1	2:30		K.	Muldy
11 2	2:30	3.80 3.80	27	
	2.30	⊋ S'C	3	
, 1 4	2.30	2.50	60	
middle 1	2:30	2:50	7.2 2.2	
11 2	2.30	2:50	24	
11 3	2.30	2:50	35	
50.07h 1	2.30	2 50	<u> </u>	mulety
2	230	2:50	43	
11 3	2:30	2 50	32	
7	2:30	2:50	34	
		<u> </u>	<del> </del>	
	<u> </u>			

DRAWN HY: PDH

APPROVED BY: JDK

FIGURE 4

PID/FID READINGS FORM

HATCHER-SAYRE, INC.

LEXINGTON, XY

	H PI	ATCHER-SAYF	RE, INC. gs Form	Sheet of
Project Name: - Sample Location	Howe-Valle : NASP#3a HNO		ober: 0064-001	Date: 10/21/92 Distribution List:
Reviewer: Pow	eaver	. Reviewer's initio		6 8 0071
Sample #	Sample Taken	me Reeding Taken	Motor Reading (Perts Per Millen)	Comments
North 1	9:45	10:10	9	
11 2	11	11	7	
11 3	1(	41	9	
11 4	11	11	<b>1</b> C	
~~~		-	0	
middle 1	1 1	11	07	
1( 2	(1	11	<b>5</b> C	
11 3	11		<b>2</b> 5	
11 4	)¢	N <sub>4</sub>	6 12	
South 1		( )	86	
11 3	11		13	
11 4	ν,		1)	
		'(		
		<u> </u>		

		IATCHER-SAYR D/FID Reading		Sheet of
Project Name: Sample Locatio	Howe - Valle n: SASP#30 HNU	ı	ber: 0064-001	Date: 10/21/92 Distribution List:
Reviewer: P. U	n Durham Vewer 1-92 cal.	_ Sampler's Initia _ Reviewer's Initia	le: PW	6 8 0072
Sample #	Sample Taken	ime Reading Taken	Motor Reading (Parts Per Millen)	Comments
North 1	9:50	10:20	16	
11 2	11	10	21	
11 5	1(	((	10	
11 4	1(	10	15	
middle 1	11	11	13	
11 2	11	"	11	
11 3	ν	1(	12	
11 4	11	((	((	
South 1	11	(1		
1\ 2	1(	(	5	
11 3	1(	1(	8	
( '	- "	<del>                                     </del>	10	
	1			

Project Name:	HOWE.	Valley Job	Number: <u>0064-00</u>	Date: 10-22-92 Distribution List
Sample Location	on: <u>NAS</u>	HALL	·	_ 6-8 0073
			. Kevin M. Dune	Ž
Sampler: New	22-92 Ca/-	OUR 300 SI	on HNU 5000 1.8	<u>'s                                     </u>
Sample +	Til Sample Taken	Me Reading Taken	PID Reading (Parts Per Million)	Comments
North 1	12:45	1:15	3.8	
" ス	ıc	7 (	7.0	
• 3	•(	( -	10	
« 4	'(	( -	8.4	
Millel	"	. (	10.4	
" 2	"	٠,	6.2	
× 3	(4	۲,	10.4	·
u 4	<b>/</b> (	2<	8.2	
South 1	"	در	10.6	
<b>ペス</b>	16	"	7.5	
" 3	.,		10.0	
ee 4	-1		9.4	
	<u> </u>			
				•

Project Name: Howe - UALLey Job Number: 0068-00/ Date: 10-32-92 Sample Location: 5A58# 3a **Distribution List** 6 8 0074 Jampier: Kevin Durham Samplers Signature: MM 10-27-92 Cal. OVA 300 Span HNU 1-85 sun PID Reading Comments Sample # Sample Taken Reading Taken (Parts Per Million) North 9.2 5:20 5:40 10 15 19.2 2 3 8 ce " 10.5 Miscle 1 (e 6.8 11 2 3.2 3 . . c -9.0 ic 22 11.ス . . ٠, 1 < 8 2 . . 6.8 1 4 • ( 11 18 • •



1355 PILOT STUDY B 9-17-92 6:30

WO #: 91020102

LAB #: A2I210005-002

DATE RECEIVED:

9/19/92

MATRIX: SOLID

---- REQUESTED PARAMETERS -----

PARAMETER	RESULT (mg/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	NID NID NID	1 1 1	SW846 8240 SW846 8240 SW846 8240	9/22- 9/23/92 9/22- 9/23/92 9/22- 9/23/92	266039 266039 266039
1,1,1-Trichloroethane	ND	1	SW846 8240	9/22- 9/23/92	266039

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	94 111	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	109	( 74 - 121)

NOTE: AS RECEIVED

ND (NONE DETECTED)



#### 1354 PILOT STUDY A 9-17-92 6:30

WO #: 91019

LAB #: A2I210005-001

MATRIX: SOLID

DATE RECEIVED: 9/19/92

INORGANIC	ANALYTICAL	REPORT

PARAMETER		REPORTING LIMIT	_	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	90	0.5	x	USEPA 160.3	9/22- 9/23/92	266041

NOTE: AS RECEIVED



#### 1355 PILOT STUDY B 9-17-92 6:30

WO #: 91020

LAB #: A2I210005-002

MATRIX: SOLID

DATE RECEIVED: 9/19/92

· INORGANIC	ANALYTICAL	REPORT
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PARAMETER	RESULT	REPORTIN	_	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	85	0.5	x	USEPA 160.3	9/22- 9/23/92	266041

NOTE: AS EECEIVED



#### 1356 PILOT STUDY C 9-17-92 6:30

WO #: 91021102

LAB #: A2I210005-003

MATRIX: SOLID

DATE RECEIVED: 9/19/92

#### ---- REQUESTED PARAMETERS -

PARAMETER	RESULT (mg/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	1 1 1	SW846 8240 SW846 8240 SW846 8240	9/22- 9/23/92 9/22- 9/23/92 9/22- 9/23/92	266039 266039 266039
1,1,1-Trichloroethane	ND	1	SW846 8240	9/22- 9/23/92	266039

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	92 108	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	105	(74 - 121)

NOTE: AS RECEIVED (MONE DETECTED)



#### 1356 PILOT STUDY C 9-17-92 6:30

WO #: 91021

LAB #: A2I210005-003

MATRIX: SOLID

DATE RECEIVED: 9/19/92

-	INORGANIC	ANALYTICA	L REPORT
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PARAMETER	RESULT	REPORTIN LIMIT	_	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	87	0.5	x	USEPA 160.3	9/22- 9/23/92	266041

BOTE: AS RECEIVED



#### 1357 PILOT STUDY D 9-17-92 6:30

WO #: 91022102

LAB #: A2I210005-004 DATE RECEIVED: 9/19/92

MATRIX: SOLID

#### ---- REQUESTED PARAMETERS ------

PARAMETER	RESULT (mg/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	1 1 1	SW846 8240 SW846 8240 SW846 8240	9/22- 9/23/92 9/22- 9/23/92 9/22- 9/23/92	266039 266039 266039
1,1,1-Trichloroethane	ND	1	SW846 8240	9/22- 9/23/92	266039

SURROGATE RECOVERY	<u><b>%</b></u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	94	( 70 - 121)
Toluene-d8 Bromofluorobenzene	110 105	( 81 - 117) ( 74 - 121)

NOTE: AS RECEIVED
NO (NONE DETECTED)



#### 1357 PILOT STUDY D 9-17-92 6:30

WO #: 91022

LAB #: A2I210005-004

Solids, Total (TS)

MATRIX: SOLID

DATE RECEIVED: 9/19/92

	INORGANIC ANAL	YTICAL REPORT	 
PARAMETER	RESULT REPORTING LIMIT	UNIT METHOD	 <b>Q</b> C BATCH

85 0.5 % USEPA 160.3 9/22- 9/23/92 266041

NOTE: AS RECEIVED



#### 1358 PILOT STUDY E 9-17-92 6:30

WO #: 91023102

LAB #: A2I210005-005

MATRIX: SOLID

DATE RECEIVED: 9/19/92

#### ----- PEQUESTED PARAMETERS ------

PARAMETER	RESULT (mg/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	1 1 1	SW846 8240 SW846 8240 SW846 8240	9/22- 9/23/92 9/22- 9/23/92 9/22- 9/23/92	266039 266039 266039
1,1,1-Trichloroethane	ND	1	SW846 8240	9/22- 9/23/92	266039

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS				
1,2-Dichloroethane-d4	91	( 70 - 121)				
Toluene-d8 Bromofluorobenzene	107 105	( 81 - 117) ( 74 - 121)				

NOTE: AS RECEIVED (NONE DETECTED)



# 1358 PILOT STUDY E 9-17-92 6:30

WO #: 91023

LAB #: A2I210005-005

MATRIX: SOLID

DATE RECEIVED: 9/19/92

PARAMETER	RESULT	REPORTIN	1G	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>	
Solids, Total (TS)	89	0.5	x	USEPA 160.3	9/22- 9/23/92	266041	

HOTE: AS RECEIVED



#### 1359 FIELD BLANK 9-16-92 9:00

WO #: 91025101

LAB #: A2I210005-006

MATRIX: WATER

DATE RECEIVED: 9/19/92

#### ---- PEQUESTED PARAMETERS - - - - - -

<u>PARAMETER</u>	RESULT (ug/L )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	5 5 5	SW846 8240 SW846 8240 SW846 8240	9/22/92 9/22/92 9/22/92	267012 267012 267012
1,1,1-Trichloroethane	ND	5	SW846 8240	9/22/92	267012

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS			
1,2-Dichloroethane-d4	95	( 76 - 114)			
Toluene-d8 Bromofluorobenzene	99 98	( 88 - 110) ( 86 - 115)			
DI OMOTTUOI OPEUSEUS	70	( 00 - 113)			

NOTE: AS RECEIVED (NONE DETECTED)



QUALITY CONTROL SECTION



#### QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicates (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD reports may not reflect the same batch numbers as those of the samples contained in the analytical report.



# QUALITY ASSURANCE/QUALITY CONTROL PROGRAM ELEMENTS

WADSWORTH/ALERT Laboratories conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data.

Quality control samples provide a mechanism for assessing the overall quality of the analytical process and can be used to indicate the useability of the analytical data. These QC samples include check samples, method blanks, matrix spikes and surrogate spikes.

The CHECK SAMPLE is used to demonstrate that all laboratory analytical processes were functioning properly when the associated sample batch was prepared and analyzed. The check sample is a simulated sample spiked with representative analytes prepared and analyzed with a batch of samples. Spike recovery values from this check sample must meet laboratory established acceptance criteria.

The METHOD BLANK is used to measure the level of any background contamination in the laboratories analytical system. The method blank is carried through the entire process, including the preparation, and consists of all of the reagents specific to the method.

All analytes of interest in the method blank for organic analyses must be below the method detection limits except for the following compounds:

#### **Volatiles**

Methylene chloride 2-Butanone Acetone

#### Semivolatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate
Di-n-octyl phthalate

These commonly-detected laboratory contaminants may be present in the method blank at up to five times the method reporting limit.

For metals analyses, if any analyte concentration in the method blank is above the method reporting limit, then the lowest concentration of that analyte in the associates samples must be ten times the blank concentration. Otherwise, all samples associated with the blank which are less than ten times the blank are redigested and reanalyzed.

The laboratory performs MATRIX SPIKES (MS) and MATRIX SPIKE DUPLICATES (MSD) to indicate any matrix effects within a given sample. They also allow the laboratory to gather precision and bias data for a specific method and matrix.



Since matrix effects may bias percent recovery, the laboratory performs corrective action if the precision (RPD) criteria of the MS/MSD is not met.

SURROGATE SPIKES are used by the laboratory to indicate method bias introduced by the sample matrix during the preparation and analysis of a specific method. Surrogates are normally organic compounds similar to those being analyzed for the GC or GC/MS. If surrogate recoveries fail to meet laboratory acceptance criteria it does not necessarily indicate poor laboratory control but may in fact be attributed to a sample matrix effect. In the event that surrogates fail criteria, a repreparation and reanalysis is performed to determine the presence of a matrix effect.

The laboratory uses the following surrogate recovery criteria for all organic analyses:

For the GC/MS Base/Neutral fraction the surrogate criteria requires that two of the three surrogates must meet recovery limits. The third surrogate must have a recovery of ten percent or greater.

For the GC/MS Acid fraction the surrogate criteria requires that two of the three surrogates must meet recovery limits. The third surrogate must have a recovery of ten percent or greater.

For GC/ECD Pesticides, the surrogate criteria requires that one of the two surrogates must meet recovery limits.

For Volatiles, PCBs and Herbicides all surrogates utilized must meet surrogate recovery limits.



### CHECK SAMPLE REPORT

QC BATCH: 266039

LAB #: A21220000-039 C

MATRIX: SOLID

PREPARATION DATE: 9/22/92

DATE ANALYZED: 9/23/92

## 

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS
1,1-Dichloroethene	86	( 56-139)
Trichloroethene	88	(79-128)
Chlorobenzene	90	( 79-118)
Toluene	88	( 78-122)
Benzene	83	( 77-122)



#### CHECK SAMPLE REPORT

QC BATCH: 267012

LAB #: A2I230000-012 C

MATRIX: WATER

PREPARATION DATE:

9/22/92

DATE ANALYZED: 9/22/92

----- Volatile Organics, GC/MS ------

	SPIKE PERCENT	Q/C
COMPOUND	RECOVERY	LIMITS
1,1-Dichloroethene	88	( 67-126)
Trichloroethene	96	( 79–130)
Chlorobenzene	98	( 86-116)
Toluene	99	( 82-119)
Benzene	97	( 79-122)



# CHECK SAMPLE REPORT

LAB #: A2I210005

-	-	INORGANIC	ANALYTICAL	REPORT	-	-	-	-	-	-	-	-	-	-

COMPOUND	SPIKE PERCENT <u>RECOVERY</u>	<u>LIMITS</u>	<u>MATRIX</u>	PREPARATION - ANALYSIS DATE	Q/C BATCH
Solids, Total (TS)	98	( 89-110)	SOLID	9/22- 9/23/92	266041



#### INTRA-LAB BLANK REPORT

LAB #: A2I220000-039

MATRIX: SOLID

----- VOLATILE ORGANICS, GC/MS ----

PARAMETER	RESULT (mg/kg)	REPORTING LIMIT	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	1 1 1	9/22- 9/23/92 9/22- 9/23/92 9/22- 9/23/92	266039 266039 266039
1,1,1-Trichloroethane	ND	1	9/22- 9/23/92	266039

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	97 111	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	105	(74 - 121)

NOTE:



#### INTRA-LAB BLANK REPORT

LAB #: A2I230000-012

MATRIX: WATER

----- VOLATILE ORGANICS, GC/MS -----

<u>PARAMETER</u>	RESULT (ug/L )	REPORTING LIMIT	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	5 5 5	9/22/92 9/22/92 9/22/92	267012 267012 267012
1,1,1-Trichloroethane	ND	5	9/22/92	267012

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	96	( 76 - 114)
Toluene-d8	102	( 88 - 110)
Bromofluorobenzene	99	( 86 - 115)

NOTE:

ND (NONE DETECTED)



#### INTRA-LAB BLANK REPORT

LAB #: A21210005

	INORG	ANIC ANALYTICA	AL REPO	)RT		
PARAMETER	RESULT	REPORTINGLIMIT	UNIT	<u>MATRIX</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
<del></del>						
Colido Total (TC)	NT	0.5	,	GOT TD	9/22- 9/23/92	266041



#### MATRIX SPIKE REPORT

QC BATCH: 266039

LAB #: A2I210005-004 S

MATRIX: SOLID

WO #: 91022

PREPARATION DATE: 9/22/92

DATE ANALYZED: 9/23/92

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUF PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS
1,1-Dichloroethene	219	212	( 59-153)	3	( 0- 27)
Trichloroethene	90	88	(77-134)	3	( 0- 16)
Chlorobenzene	94	92	(77-122)	1	(0-20)
Toluene	92	92	(73-139)	1	(0-21)
Benzene	91	90	(81-127)	2	( 0- 19)



#### MATRIX SPIKE REPORT

QC BATCH: 265040

LAB #: A2I120020-006 S

MATRIX: WATER

WO #: 89095

PREPARATION DATE: 9/18/92

DATE ANALYZED: 9/18/92

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUI PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS
1,1-Dichloroethene	101	100	( 68-126)	1	( 0- 20)
Trichloroethene	101	102	(82-130)	1	(0-13)
Chlorobenzene	100	103	(86-115)	2	( 0- 10)
Toluene	100	102	( 80-123)	2	( 0- 15)
Benzene	103	104	( 80-125)	2	( 0- 13)



# CHAIN OF CUSTODY RECORD

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WADSWORTH/ Division of Enseco Incorporated Laboratories

Corporate and Laboratory:

4101 Snuffel Drive. NW North Canton, OH 44720

216-497-9396 FAX 216-497-0772

# ANALYTICAL REPORT REVISED

PROJECT NO. 0064-001

HOWE-VALLEY

Presented to:

JIM KNAUSS

HATCHER SAYRE

WADSWORTH/ALERT LABORATORIES

Alesia M. Danford Project Manager

Mark P. Nebrolo

Mark P. Nebiolo Laboratory Manager

October 16, 1992



#### PROJECT NARRATIVE

The following report contains analytical results for ten soil samples and seven Quality Control samples submitted to WADSWORTH/ALERT Laboratories by Hatcher Sayre, Inc., from the Howe Valley site, project number 0064-001. The samples were received September 26, 1992, according to documented sample acceptance procedures.

WADSWORTH/ALERT Laboratories utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the end of the report.



#### ANALYTICAL METHODS SUMMARY

Wadsworth/ALERT Laboratories utilizes only USEPA approved methods in analytical work. The methods used for the analyses presented in the following report are listed below.

<u>Parameters</u>	<u>Methods</u>
TCLP Extraction	SW486 1311
Volatile Organics, GC/MS	SW846 8240
Silver	SW846 6010
Cadmium	SW846 6010
Chromium	SW846 6010
Nickel	SW846 6010
Lead	SW846 6010
Cyanide, Total	SW846 9010
Cyanide, Amenable	SW846 9010
Solids, Total (TS)	USEPA 160.3 MODIFIED
Cyanide, amenable	SW846 9012

#### References:

SW846	"Test Meth	ods for	Evaluating	Solid W	vaste,	Physical/Chemical
	Methods",	Third	Edition, Se	ptember.	1986.	

USEPA 600/4-79-02, "Methods for Chemical Analysis of Water and Wastes", March, 1983.



#### SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

93968 A21280009-001 1360 WEST SURFACE 9-24-92 1:45 92969 A21280009-002 1361 EAST SURFACE 9-24-92 1:45 92974 A21280009-003 1362 WEST SURFACE 9-24-92 1:45 92975 A21280009-004 1363 EAST SURFACE 9-24-92 1:45 92976 A21280009-005 1364 WEST SUBSURFACE 9-24-92 2:45 92978 A21280009-006 1365 EAST SUBSURFACE 9-24-92 3:45 92979 A21280009-007 1366 WEST SUBSURFACE 9-24-92 3:45 92981 A21280009-008 1367 EAST SUBSURFACE 9-24-92 2:45 92982 A21280009-009 1368 SASP 1 9-24-92 2:05 92983 A21280009-010 1369 EQUIPMENT BLANK 9-24-92 5:30 92984 A21280009-011 1370 EQUIPMENT BLANK 9-24-92 5:30 92985 A21280009-012 1371 EQUIPMENT BLANK 9-24-92 6:00 92986 A21280009-013 1372 EQUIPMENT BLANK 9-24-92 6:00 92987 A21280009-014 1374 TRIP BLANK 9-24-92 92988 A21280009-015 1375 TRIP BLANK 9-24-92 92988 A21280009-016 1376 FIELD BLANK 9-24-92 92994 A21280009-017 1377 SASP 2 9-24-92 2:05



1368 SASP 1 9-24-92 2:05

WO #: 92982101

LAB #: A2I280009-009

MATRIX: SOLID

DATE RECEIVED: 9/26/92

## 

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,2-Dichloroethene, Total 1,1,1-Trichloroethane 1,1-Dichloroethane	ND <b>850</b> ND	620 <b>620</b> 620	SW846 8240 SW846 8240 SW846 8240	10/01-10/02/92 10/01-10/02/92 10/01-10/02/92	275049 275049 275049
Tetrachloroethene	19,000	620	SW846 8240	10/01-10/02/92	275049

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	118 115	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	112	(74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)

BLEVATED DETECTION LIMITS DUE TO TIC(S:..



# 1369 EQUIPMENT BLANK 9-24-92 5:30

\_ \_ \_ \_ - - - - - REQUESTED METALS - - - - - - -

WO #: 92983

LAB #: A2I280009-010

MATRIX: WATER

DATE RECEIVED: 9/26/92

-		•				
PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Silver	ND	0.01	mg/L	SW846 6010	9/30-10/01/92	274015
Cadmium	ND	0.01	mg/L	SW846 6010	9/30-10/01/92	274015
Chromium	ND	0.02	mg/L	SW846 6010	9/30-10/01/92	274015
Nickel	ND	0.04	mg/L	SW846 6010	9/30-10/01/92	274015
Lead	ND		mg/L	SW846 6010	9/30-10/01/92	274015

POTE:

AS RECEIVED (NONE DETECTED)



#### 1370 EQUIPMENT BLANK 9-24-92 5:30

WO #: 92984

LAB #: A2I280009-011

MATRIX: WATER

DATE RECEIVED: 9/26/92

#### 

PARAMETER	RESULT	REPORTIN LIMIT	G <u>UNIT</u>	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Cyanide, Total	ND	0.005	mg/L	SW846 9010	10/01/92	275028
Cyanide, amenable	ND	0.005	mg/L	SW846 9012	10/01/92	275028

NOTE: AS RECEIVED 95 909E DETECTED)



# 1371 EQUIPMENT BLANK 9-24-92 6:00

WO #: 92985

LAB #: A2I280009-012

MATRIX: WATER

DATE RECEIVED: 9/26/92

	<del>-</del> -	REQUES	TED META	LS		
PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Silver	ND	0.01	mg/L	SW846 6010	9/30-10/01/92	274015
Cadmium	ND	0.01	mg/L	SW846 6010	9/30-10/01/92	274015
Chromium	ND	0.02	mg/L	SW846 6010	9/30-10/01/92	274015
Nickel	ND	0.04	mg/L	SW846 6010	9/30-10/01/92	274015
Lead	ND	0.1	mg/L	SW846 6010	9/30-10/01/92	274015

BOTE:

AS RECEIVED (RONE BETECTED)



#### 1372 EQUIPMENT BLANK 9-24-92 6:00

WO #: 92986

LAB #: A2I280009-013

MATRIX: WATER

DATE RECEIVED: 9/26/92

#### 

PARAMETER	RESULT	REPORTIN	G <u>UNIT</u>	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Cyanide, Total	ND	0.005	mg/L	SW846 9010	10/01/92	275028
Cyanide, amenable	ND	0.005	mg/L	SW846 9012	10/01/92	275028

NOTE: AS RECEIVED SE SONE DETECTED.



## 1374 TRIP BLANK 9-24-92

WO #: 92987

LAB #: A2I280009-014

MATRIX: WATER

DATE RECEIVED: 9/26/92

		REQUES	TED META	LS		
<u>PARAMETER</u>	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Silver	ND	0.01	mg/L	SW846 6010	9/30-10/01/92	274015
Cadmium	ND	0.01	mg/L	SW846 6010	9/30-10/01/92	274015
Chromium	ND	0.02	mg/L	SW846 6010	9/30-10/01/92	274015
Nickel	ND	0.04	ng/L	SW846 6010	9/30-10/01/92	274015
Lead	ND	0.1	ng/L	SW846 6010	9/30-10/01/92	274015

9073:

AS RECEIVED VI (NONE DETECTED)



#### 1375 TRIP BLANK 9-24-92

WO #: 92988

LAB #: A2I280009-015

MATRIX: WATER

DATE RECEIVED: 9/26/92

#### 

PARAMETER	RESULT	REPORTIN	_	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Cyanide, Total	ND	0.005	mg/L	SW846 9010	10/01/92	275028
Cyanide, amenable	ND	0.005	mg/L	SW846 9012	10/01/92	275028

MOTE: AS RECEIVED NE ROME DETECTED:





1376 FIELD BLANK 9-24-92 2:00

WO #: 92992101

MATRIX: WATER

LAB #: A2I280009-016

DATE RECEIVED:

9/26/92

TCLP EXTRACTION DATE: 9/30/92

---- PEQUESTED PARAMETERS ---

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching Procedure Method 1311 (55 FR 26986)

PARAMETER	RESULT (mg/L )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
Tetrachloroethene	ND	0.005	SW846 8240	10/02/92	275039
Trichloroethene	ND	0.005	SW846 8240	10/02/92	275039

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	101 100	( 76 - 114) ( 88 - 110)
Bromofluorobenzene	104	( 86 - 115)

NOTE: AS RECEIVED (NONE DETECTED)



1377 SASP 2 9-24-92 2:05

WO #: 92994101

LAB #: A2I280009-017

MATRIX: SOLID

DATE RECEIVED: 9/26/92

## - - - - - - REQUESTED PARAMETERS - - - - -

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,2-Dichloroethene, Total 1,1,1-Trichloroethane 1,1-Dichloroethane	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/01-10/02/92 10/01-10/02/92 10/01-10/02/92	275049 275049 275049
Tetrachloroethene	8,500	620	SW846 8240	10/01-10/02/92	275049

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	111 115 119	(70 - 121) (81 - 117) (74 - 121)

NOTE: AS RECEIVED (NONE DETECTED) MD

ELEVATED DETECTION LINITS DUE TO TICES.



QUALITY CONTROL SECTION



## QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.



# QUALITY ASSURANCE/QUALITY CONTROL PROGRAM ELEMENTS

WADSWORTH/ALERT Laboratories conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data.

Quality control samples provide a mechanism for assessing the overall quality of the analytical process and can be used to indicate the useability of the analytical data. These QC samples include check samples, method blanks, matrix spikes and surrogate spikes.

The CHECK SAMPLE is used to demonstrate that all laboratory analytical processes were functioning properly when the associated sample batch was prepared and analyzed. The check sample is a simulated sample spiked with representative analytes prepared and analyzed with a batch of samples. Spike recovery values from this check sample must meet laboratory established acceptance criteria.

The METHOD BLANK is used to measure the level of any background contamination in the laboratories analytical system. The method blank is carried through the entire process, including the preparation, and consists of all of the reagents specific to the method.

All analytes of interest in the method blank for organic analyses must be below the method detection limits except for the following compounds:

#### <u>Volatiles</u>

Methylene chloride 2-Butanone Acetone

#### <u>Semivolatiles</u>

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate
Di-n-octyl phthalate

These commonly-detected laboratory contaminants may be present in the method blank at up to five times the method reporting limit.

For metals analyses, if any analyte concentration in the method blank is above the method reporting limit, then the lowest concentration of that analyte in the associates samples must be ten times the blank concentration. Otherwise, all samples associated with the blank which are less than ten times the blank are redigested and reanalyzed.

The laboratory performs MATRIX SPIKES (MS) and MATRIX SPIKE DUPLICATES (MSD) to indicate any matrix effects within a given sample. They also allow the laboratory to gather precision and bias data for a specific method and matrix.



Since matrix effects may bias percent recovery, the laboratory performs corrective action if the precision (RPD) criteria of the MS/MSD is not met.

SURROGATE SPIKES are used by the laboratory to indicate method bias introduced by the sample matrix during the preparation and analysis of a specific method. Surrogates are normally organic compounds similar to those being analyzed for the GC or GC/MS. If surrogate recoveries fail to meet laboratory acceptance criteria it does not necessarily indicate poor laboratory control but may in fact be attributed to a sample matrix effect. In the event that surrogates fail criteria, a repreparation and reanalysis is performed to determine the presence of a matrix effect.

The laboratory uses the following surrogate recovery criteria for all organic analyses:

For the GC/MS Base/Neutral fraction the surrogate criteria requires that two of the three surrogates must meet recovery limits. The third surrogate must have a recovery of ten percent or greater.

For the GC/MS Acid fraction the surrogate criteria requires that two of the three surrogates must meet recovery limits. The third surrogate must have a recovery of ten percent or greater.

For GC/ECD Pesticides, the surrogate criteria requires that one of the two surrogates must meet recovery limits.

For Volatiles, PCBs and Herbicides all surrogates utilized must meet surrogate recovery limits.



QC BATCH: 275039

LAB #: A2J010000-039 C

MATRIX: SOLID

PREPARATION DATE: 10/02/92

DATE ANALYZED: 10/02/92

TCLP EXTRACTION DATE: 9/30/92

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS
1,1-Dichloroethene	106	( 50-150)
Trichloroethene	105	( 50-150)
Chlorobenzene	113	( 50-150)
Toluene	112	( 50-150)
Benzene	108	( 50-150)



QC BATCH: 275049

LAB #: A2J010000-049 C

MATRIX: SOLID

PREPARATION DATE: 10/01/92

DATE ANALYZED: 10/02/92

## 

	SPIKE PERCENT	Q/C	
COMPOUND	RECOVERY	LIMITS	
1,1-Dichloroethene	93	( 56-139)	
Trichloroethene	101	( 79-128)	
Chlorobenzene	112	( 79-118)	
Toluene	111	( 78-122)	
Benzene	107	(77-122)	



LAB #: A21280009

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE	
	BATCH: 274015 MATRIX	: WATER		
Silver	96	( 82-110)	9/30-10/01/92	
Cadmium	96	(77-110)	9/30-10/01/92	
Chromium	<b>9</b> 9	( 86-110)	9/30-10/01/92	
Nickel	96	(81-111)	9/30-10/01/92	
Lead	94	( 80-116)	9/30-10/01/92	



LAB #: A2I280009

\*\*\* TCLP \*\*\*

TCLP EXTRACTION DATE: 9/30/92

---- METALS -----

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE	
	BATCH: 274054 M	ATRIX: SOLID		
Silver	89	( 50-150)	9/30-10/01/92	
Cadmium	84	( 50-150)	9/30-10/01/92	
Chromium	88	( 50-150)	9/30-10/01/92	
Nickel	84	( 50-150)	9/30-10/01/92	
Lead	82	( 50-150)	9/30-10/01/92	



QC BATCH: 274058

LAB #: A21300000-058 C

MATRIX: WATER

PREPARATION DATE: 9/30/92

DATE ANALYZED: 9/30/92

SPIKE

PERCENT

Q/C

RECOVERY

LIMITS

COMPOUND

84 ( 56-117)

Cyanide



QC BATCH: 275028

LAB #: A2J010000-028 C

MATRIX: WATER

PREPARATION DATE: 10/01/92

DATE ANALYZED: 10/01/92

SPIKE

PERCENT

Q/C

RECOVERY

LIMITS

Cyanide

COMPOUND

56 ( 56-117)



QC BATCH: 274008

Solids, Total (TS)

LAB #: A2I300000-008 C

MATRIX: SOLID

PREPARATION DATE: 9/29/92

DATE ANALYZED: 9/30/92

SPIKE

PERCENT

Q/C LIMITS

COMPOUND RECOVERY

104

(89-110)



LAB #: A2J010000-039

MATRIX: WATER

TCLP EXTRACTION DATE: 9/30/92

----- VOLATILE ORGANICS, GC/MS -----

PARAMETER	RESULT (mg/L )	REPORTINGLIMIT	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
Tetrachloroethene	ND	0.005	10/02/92	275039
Trichloroethene	ND	0.005	10/02/92	275039

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	103 102	( 76 - 114) ( 88 - 110)
Bromofluorobenzene	104	( 86 - 115)

WHE DETERMED!



LAB #: A2J010000-049

MATRIX: SOLID

	VOLATILE	ORGANICS	, GC/MS -
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PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
Styrene	ND	620	10/01-10/02/92	275049 275049
1,1,2,2-Tetrachloroethane Tetrachloroethene	ND ND	620 620	10/01-10/02/92 10/01-10/02/92	275049
Toluene 1,1,1-Trichloroethane 1,1,2-Trichloroethane	ND ND ND	620 620 620	10/01-10/02/92 10/01-10/02/92 10/01-10/02/92	275049 275049 275049
Trichloroethene Vinyl chloride Xylenes, Total	ND ND ND	620 1,200 620	10/01-10/02/92 10/01-10/02/92 10/01-10/02/92	275049 275049 275049

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	109	( 70 - 121)
Toluene-d8	111	(81 - 117)
Bromofluorobenzene	108	( 74 - 121)

NOTE:

NO INONE DETECTED)



LAB #: A2I280009

		MET	TALS		
PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH: 274015	MATRIX: WATER		
Silver	ND	0.01	mg/L	SW846 6010	9/30-10/01/92
Cadmium	ND	0.01	mg/L	SW846 6010	9/30-10/01/92
Chromium	ND	0.02	mg/L	SW846 6010	9/30-10/01/92
Nickel	ND	0.04	mg/L	SW846 6010	9/30-10/01/92
Lead	ND	0.1	mg/L	SW846 6010	9/30-10/01/92

ROTE:

SI - SENE DETECTED:

9/30-10/01/92

9/30-10/01/92



Nickel

Lead

ND

ND

## INTRA-LAB BLANK REPORT

LAB #: A2I280009

\*\*\* TCLP \*\*\*

TCLP EXTRACTION DATE: 9/30/92

SW846 6010 SW846 6010

		MET	ALS		
PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
Silver Cadmium Chromium	ND ND ND	BATCH: 274054 0.1 0.1 0.1	MATRIX:SOLID mg/L mg/L mg/L	SW846 6010 SW846 6010 SW846 6010	9/30-10/01/92 9/30-10/01/92 9/30-10/01/92

mg/L

mg/L

0.04

0.1

NOTE:

VI (NONE DEFECTED)



LAB #: A2I300000-058 B

MATRIX: SOLID

	- INORGANIC	ANALYTICAL	REPORT		
<u>PARAMETER</u>	RESULT	REPORTING LIMIT	UNIT	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Cyanide	ND	0.25	mg/kg	9/30/92	274058



LAB #: A2J010000-028 B

MATRIX: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNIT	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Cvanide	ND	0.005	mg/L	10/01/92	275028



LAB #: A2I300000-008 B

MATRIX: SOLID

	INORGANIC	ANALYTICAL	REPORT -		
PARAMETER	RESULT	REPORTING LIMIT	UNIT	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	ND	0.5	%	9/29- 9/30/92	274008



## MATRIX SPIKE REPORT

QC BATCH: 266039

LAB #: A2I210005-004 S

MATRIX: SOLID

WO #: 91022

PREPARATION DATE: 9/22/92

DATE ANALYZED: 9/23/92

# 

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUI PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS			
1,1-Dichloroethene	219	212	( 59-153)	3	( 0- 27)			
Trichloroethene	90	88	(77-134)	3	( 0- 16)			
Chlorobenzene	94	92	(77-122)	1	( 0- 20)			
Toluene	92	92	(73-139)	1	( 0- 21)			
Benzene	91	90	(81-127)	2	( 0- 19)			



## MATRIX SPIKE REPORT

QC BATCH: 274062

LAB #: A2I170035-007 S

MATRIX: WATER

WO #: 90324

PREPARATION DATE: 9/29/92

DATE ANALYZED: 9/29/92

# 

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUI PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS			
1,1-Dichloroethene	92	94	( 68-126)	1	( 0- 20)			
Trichloroethene	98	101	( 82-130)	3	(0-13)			
Chlorobenzene	97	100	(86-115)	4	( 0- 10)			
Toluene	90	92	( 80-123)	2	( 0- 15)			
Benzene	90	95	(80-125)	6	( 0- 13)			



# METALS SPIKE REPORT

WATER - ICP

			META	LS			
	SPIKE PERCENT	SPIKE/DU!	Q/C		RPD	PREPARATION-	W/O#
COMPOUND	RECOVERY	RECOVERY	LIMITS	RPD	LIMITS	ANALYSIS DATE	#/ <b>U#</b>
		0.5	(70-112)	0	(0-20)	9/08-9/09/92	87329
Silver	95	95 100	(52-134)	2	(0-20)	9/08-9/09/92	87329
Aluminum	104	102	(52-134)	0	(0-20)	9/08-9/09/92	87329
Arsenic	98	98	(53-130)	U	(0 20)	3,00 0,00,00	
	101	104	(73-110)	3	(0-20)	9/14-9/16/92	87704
Boron	101	97	(73-115)	1	(0-20)	9/08-9/09/92	87329
Barium	98		(72-110)	1	(0-20)	9/08-9/09/92	87329
Beryllium	99	98	(12-110)	,	(0 20)	3, 33 0, 54,	
0 - 3 - 4	98	97	(38-143)	1	(0-20)	9/08-9/09/92	87329
Calcium		92	(69-112)	2	(0-20)	9/08-9/09/92	87329
Cadmium	94	94	(72-109)	4	(0-20)	9/08-9/09/92	87329
Cobalt	98	34	(12 100)	~	(5 25)		
<b>A</b> 1 2	0.0	97	(75-110)	1	(0-20)	9/08-9/09/92	87329
Chromium	96	96	(75-110)	1	(0-20)	9/08-9/09/92	87329
Copper	97	99	(56-129)	2	(0-20)	9/08-9/09/92	87329
Iron	101	99	(30-123)	-	(0 20)	•, ••	
Potaccium	96	96	(48-147)	0	(0-20)	9/08-9/09/92	87329
Potassium	96	96	(57-127)	0	(0-20)	9/08-9/09/92	87329
Magnesium	96	95	(72-112)	1	(0-20)	9/08-9/09/92	87329
Manganese	90	33	(		•		
Wolyhdonym	109	108	(69-122)	1	(0-20)	9/25-9/30/92	90677
Molybdenum	97	97	(54-134)	0	(0-20)	9/08-9/09/92	87329
Sodium		93	(70-112)	1	(0-20)	9/08-9/09/92	27329
Nickel	94	33	(10 112)	•	(0 4-)	•	
	97	100	(68-112)	3	(0-20)	9/01-9/10/92	86261
Lead		94	(70-115)	2	(0-20)	9/08-9/09/92	57329
Antimony	96	95	(47-128)	5	(0-20)	9/08-9/09/92	87329
Selenium	100	93	(=, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	J	(0.20)	•	
Cilicon	107	108	(83-111)	1	(0-20)	1/31-1/31/92	36719
Silicon		93	(73-123)	2	(0-20)	7/03-7/13/92	73705
Tin	91	33 77	(83-112)	1	(0-20)	5/24-6/26/92	71292
Strontium	78	, ,	(03-1,2)	'	(5 25)	-, -	
Tibonium	110	116	(30-111)	5	(0-20)	9/15-9/17/91	88360
Titanium		97	(50-121)	2	(0-20)	9/24-8/23/92	34055
Thallium	99	94	(72-112)	2	(0-20)	9/25-9/30/92	90677
Tungsten	92	<b>y</b> →	(12:12)	-	(5 25)		
	20	93	(72-112)	1	(9-20)	9/08-9/09/32	87329
Vanadium	99	95 97	(71-114)	1	(0-20)	9/08-9/09/92	37329
Inc	98	1 6.	( , , , , , -)	,	(5 25)	- •	



# MATRIX SPIKE REPORT

LAB #: A2I280009-003

\*\*\* TCLP \*\*\*

TCLP EXTRACTION DATE: 9/30/92

----- METALS -----

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUI PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		H:274054		LID		0.400 10.401.400
Silver	96	94	( 50-150)	2	( 0- 20)	9/30-10/01/92
Cadmium	89	86	( 50-150)	4	( 0- 20)	9/30-10/01/92
Chromium	103	102	( 50-150)	1	(0-20)	9/30-10/01/92
Nickel	90	86	( 50-150)	4	( 0- 20)	9/30-10/01/92
Lead	90	89	( 50-150)	1	( 0- 20)	9/30-10/01/92



## MATRIX SPIKE REPORT

QC BATCH: 275028

LAB #: A2I190012-004 S

MATRIX: WATER

COMPOUND

WO #: 90852

PREPARATION DATE: 10/01/92

DATE ANALYZED: 10/01/92

SPIKE SPIKE/DUP

PERCENT PERCENT Q/C

RPD

RECOVERY RECOVERY LIMITS RPD LIMITS

Cyanide 60 46 (18-123) 27 (0-68)



# HATCHER-SAYRE, INC.

Ω		STRONTON	RELIMOUS		Paul n	1311 Faulence	1310 Equipment Blunk	1369 Equipment Blank	JS1/5 1581	18/160st-Subsciluce	136 ust Subsulince	145 cast Subscillace	1364 west Subscribes	1363 two surfice	1362 West Surface	1361 East Surface	360 west Surface	HATCHER-SAYRE, SAMPLE NO.	PRINTED NAME	ww	SAMPLER'S SIGNATURE	PROJECT NO.	
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WADSWORTH/ Division of Ensech incorporated Laboratories

Corporate and Laboratory:

4101 Shuffel Drive, NW North Canton, OH 44720

216-497-9396 FAX 216-497-0772

### ANALYTICAL REPORT

PROJECT NO. 0064-001

HOWE VALLEY

Presented to:

JIM KNAUSS

HATCHER SAYRE

WADSWORTH/ALERT LABORATORIES

Alesia M. Danford
Project Manager

Mark P. Nebrolo-

Mark P. Nebiolo Laboratory Manager

October 16, 1992



#### PROJECT NARRATIVE

The following report contains analytical results for four solid samples submitted to WADSWORTH/ALERT Laboratories by Hatcher Sayre, Inc., from the Howe Valley site, project number 0064-001. The samples were received September 29, 1992, according to documented sample acceptance procedures.

WADSWORTH/ALERT Laboratories utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the end of the report.



## ANALYTICAL METHODS SUMMARY

Wadsworth/ALERT Laboratories utilizes only USEPA approved methods in analytical work. The methods used for the analyses presented in the following report are listed below.

## <u>Parameters</u>

Methods

Volatile Organics, GC/MS Solids, Total (TS)

SW846 8240 USEPA 160.3 MODIFIED

#### References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical

Methods", Third Edition, September, 1986.

USEPA 600/4-79-02, "Methods for Chemical Analysis of Water and

Wastes", March, 1983.



# SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

<u>₩0</u> #	LABORATORY ID	SAMPLE IDEN	TIFICATION	
93348	A21290029-001	1384 NASP1	9-28-92 5:56	0
93349	A21290029-002	1385 NASP2	9-28-92 5:56	
93350	A21290029-003	1386 NASP3	9-28-92 5:56	
93351	A21290029-004	1387 NASP4	9-28-92 5:56	



1384 NASP1 9-28-92 5:50

WO #: 93348101

LAB #: A2I290029-001

MATRIX: SOLID

DATE RECEIVED: 9/29/92

## ----- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC BATCH
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 6	5 5 5	SW846 8240 SW846 8240 SW846 8240	10/08/92 10/08/92 10/08/92	282011 282011 282011
1,1,1-Trichloroethane	ND	5	SW846 8240	10/08/92	282011

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	98	( 70 - 121)
Toluene-d8	104	( 81 - 117)
Bromofluorobenzene	90	( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



# 1384 NASP1 9-28-92 5:50

WO #: 93348

LAB #: A2I290029-001

MATRIX: SOLID

DATE RECEIVED: 9/29/92

INORGANIC	ANALYTICAL	REPORT
THOMOTOR	WIND TITLE	1077 7 7 7 7 7

<u>PARAMETER</u>		REPORTIN		METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	87	0.5	x	USEPA 160.3	10/01-10/02/92	275055

NOTE: AS RECRIVED



1385 NASP2 9-28-92 5:50

WO #: 93349101

LAB #: A2I290029-002

MATRIX: SOLID

DATE RECEIVED: 9/29/92

## ----- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 17	5 5 5	SW846 8240 SW846 8240 SW846 8240	10/07/92 10/07/92 10/07/92	282011 282011 282011
1,1,1-Trichloroethane	ND	5	SW846 8240	10/07/92	282011

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	112	( 70 - 121)
Toluene-d8	102	( 81 - 117)
Bromofluorobenzene	99	( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



## 1385 NASP2 9-28-92 5:50

WO #: 93349

LAB #: A2I290029-002

MATRIX: SOLID

PARAMETER

DATE RECEIVED: 9/29/92

 I NOE	RGANIC AN	ALYTICAL	REPORT				
	REPORTING	3		PREPAR	ATION -	QC	
RESULT	LIMIT	UNIT	METHOD	ANALYS	IS DATE	BATCH	

90 0.5 % USEPA 160.3 10/01-10/02/92 275055 Solids, Total (TS)

BOTE: AS RECEIVED



1386 NASP3 9-28-92 5:50

WO #: 93350101

LAB #: A2I290029-003

MATRIX: SOLID

DATE RECEIVED: 9/29/92

## ---- REQUESTED PARAMETERS ------

PARAMETER	RESULT (ug/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC BATCH
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 27	5 5 5	SW846 8240 SW846 8240 SW846 8240	10/07/92 10/07/92 10/07/92	282011 282011 282011
1,1,1-Trichloroethane	ND	5	SW846 8240	10/07/92	282011

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	96	( 70 - 121)
Toluene-d8	102	( 81 - 117)
Bromofluorobenzene	90	( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



# 1386 NASP3 9-28-92 5:50

**WO #:** 93350

LAB #: A2I290029-003

MATRIX: SOLID

DATE RECEIVED: 9/29/92

INORGANIC	ANALYTICAL	REPORT -
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PARAMETER	RESULT	REPORTIN		<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	87	0.5	x	USEPA 160.3	10/01-10/02/92	275055

MOTE: AS RECEIVED



1387 NASP4 9-28-92 5:50

WO #: 93351101

LAB #: A2I290029-004

MATRIX: SOLID

DATE RECEIVED: 9/29/92

# ----- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 8	5 5 5	SW846 8240 SW846 8240 SW846 8240	10/08/92 10/08/92 10/08/92	283006 283006 283006
1,1,1-Trichloroethane	NID	5	SW846 8240	10/08/92	283006

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	104	( 70 - 121)
Toluene-d8	102	(81 - 117)
Bromofluorobenzene	113	(74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



# 1387 NASP4 9-28-92 5:50

WO #: 93351

LAB #: A2I290029-004

MATRIX: SOLID

DATE RECEIVED: 9/29/92

PARAMETER	RESULT	REPORTIN		METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	90	0.5	x	USEPA 160.3	10/01-10/02/92	275055

BOTE: AS RECEIVED



QUALITY CONTROL SECTION



## QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.



# CHECK SAMPLE REPORT

QC BATCH: 282011

LAB #: A2J080000-011 C

MATRIX: SOLID

PREPARATION DATE: 10/07/92

DATE ANALYZED: 10/07/92

----- Volatile Organics, GC/MS ------

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS
1,1-Dichloroethene	113	( 56-139)
Trichloroethene	99	( 79-128)
Chlorobenzene	103	( 79-118)
Toluene	106	( 78-122)
Benzene	106	( 77-122)



#### CHECK SAMPLE REPORT

QC BATCH: 283006

LAB #: A2J090000-006 C

MATRIX: SOLID

PREPARATION DATE: 10/08/92

DATE ANALYZED: 10/08/92

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS
1,1-Dichloroethene	114	( 56-139)
Trichloroethene	91	(79-128)
Chlorobenzene	99	( 79-118)
Toluene	103	(78-122)
Benzene	103	(77-122)



# CHECK SAMPLE REPORT

LAB #: A21290029

COMPOUND	SPIKE PERCENT RECOVERY	<u>LIMITS</u>	MATRIX	PREPARATION - ANALYSIS DATE	Q/C BATCH	
Solids, Total (TS)	105	( 89-110)	SOLID	10/01-10/02/92	275055	



# INTRA-LAB BLANK REPORT

LAB #: A2J080000-011

MATRIX: SOLID

VOLATILE ORGAN	NICS, GC/MS
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PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	5 5 5	10/07/92 10/07/92 10/07/92	282011 282011 282011
1,1,1-Trichloroethane	ND	5	10/07/92	282011

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	95	( 70 - 121)
Toluene-d8	102	( 81 - 117)
Bromofluorobenzene	93	( 74 - 121)



# INTRA-LAB BLANK REPORT

LAB #: A2J090000-006

MATRIX: SOLID

-	VOLATIL	je orgaj	NICS,	GC/MS -
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PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND	5 5 5	10/08/92 10/08/92 10/08/92	283006 283006 283006
1,1,1-Trichloroethane	ND	5	10/08/92	283006

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	101 101	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	96	(74 - 121)

NOTE:

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# INTRA-LAB BLANK REPORT

LAB #: A21290029

	INORG.	ANIC ANALITIC	AL REPU	)KI		
PARAMETER	RESULT	REPORTING LIMIT	UNIT	MATRIX	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
2,11,11,12,12,1			<u> </u>	بيجينين		
Solids, Total (TS)	ND	0.5	x	SOLID	10/01-10/02/92	275055



# MATRIX SPIKE REPORT

QC BATCH: 275044

LAB #: A2I250018-050 S

MATRIX: SOLID

WO #: 92575

PREPARATION DATE: 9/30/92

DATE ANALYZED: 9/30/92

# ---- Volatile Organics, GC/MS -----

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUE PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS
1,1-Dichloroethene	97	94	( 59-153)	4	( 0- 27)
Trichloroethene	91	88	(77-134)	4	(0-16)
Chlorobenzene	104	102	(77-122)	2	( 0- 20)
Toluene	105	105	(73-139)	0	( 0- 21)
Benzene	100	99	(81-127)	1	( 0- 19)



COMPACT LAB	RELIMQUISHED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	Tank Mayer					1387 MBPH 1384	1386 MASP 3 9/24/2	1385 NISP2 1/20192	MSPI	HATCHER-SAYRE, INC. DATE	PRINTED NAME PAUL WEAVE	Faul Weaver	SAMPLER'S, SIGNATURE	PROJECT NO HOWE Valley	
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WADSWORTH/
Division of Enseco incorporated

Laboratories

Corporate and Laboratory:

4101 Shuffel Drive, NW North Canton, OH 44720 216-497-9396 FAX 216-497-0772

#### ANALYTICAL REPORT

PROJECT NO. 0064-001

HOWE VALLEY

Presented to:

JIM KNAUSS

HATCHER SAYRE

WADSWORTH/ALERT LABORATORIES

Alesia M. Danford Project Manager

Mark P. Nebiolo

Mark P. Nebiolo Laboratory Manager

October 16, 1992



#### PROJECT NARRATIVE

The following report contains analytical results for nine solid samples submitted to WADSWORTH/ALERT Laboratories by Hatcher Sayre, Inc., from the Howe Valley site, project number 0064-001. The samples were received October 5, 1992, according to documented sample acceptance procedures.

WADSWORTH/ALERT Laboratories utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the end of the report.



#### ANALYTICAL METHODS SUMMARY

Wadsworth/ALERT Laboratories utilizes only USEPA approved methods in analytical work. The methods used for the analyses presented in the following report are listed below.

### <u>Parameters</u>

Methods

Volatile Organics, GC/MS Solids, Total (TS) SW846 8240 USEPA 160.3 MODIFIED

#### References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986.

USEPA 600/4-79-02, "Methods for Chemical Analysis of Water and Wastes", March, 1983.



# SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO ≠	LABORATORY ID	SAMPLE IDENTIFICATION
94577	A2J050008-001	1388 NASP N 9-29-92 3:00
94579	A2J050008-002	1389 NASP S 9-29-92 3:00
94580	A2J050008-003	1392 SASP 1 10-2-92 7:00
94581	A2J050008-004	1393 SASP 2 10-2-92 7:00
94582	A2J050008-005	1394 SASP 3 10-2-92 7:00
94583	A2J050008-006	1395 SASP 4 10-2-92 7:00
94584	A2J050008-007	1396 SASP 5 10-2-92 7:00
94585	A2J050008-008	1397 SASP 6 10-2-92 7:00
94586	A2J050008-009	1398 SASP 7 10-2-92 7:00



1388 NASP N 9-29-92 3:00

WO #: 94577101

LAB #: A2J050008-001

MATRIX: SOLID

DATE RECEIVED:

10/05/92

REQUESTED	PARAMETERS
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PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,2-Dichloroethene, Total 1,1,1-Trichloroethane 1,1-Dichloroethane	ND 36,000 ND	8,900 8,900 8,900	SW846 8240 SW846 8240 SW846 8240	10/06-10/08/92 10/06-10/08/92 10/06-10/08/92	282027 282027 282027
Tetrachloroethene	250,000	8,900	SW846 8240	10/06-10/08/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	DIL DIL	( 70 - 121) ( 81 - 117) ( 74 - 121)

NOTE: AS RECEIVED

ND (NONE DETECTED)



# 1388 NASP N 9-29-92 3:00

WO #: 94577

LAB #: A2J050008-001

MATRIX: SOLID

DATE RECEIVED: 10/05/92

	I NORGA	MIC	ANALY	TICAL	REPORT
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PARAMETER	RESULT	REPORTING LIMIT	-	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	84	0.5	x	USEPA 160.3	10/06-10/07/92	280021

NOTE: AS RECEIVED



1389 NASP S 9-29-92 3:00

WO #: 94579101

LAB #: A2J050008-002

MATRIX: SOLID

DATE RECEIVED: 10/05/92

# ----- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,2-Dichloroethene, Total 1,1,1-Trichloroethane 1,1-Dichloroethane	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/08/92 10/06-10/08/92 10/06-10/08/92	282027 282027 282027
Tetrachloroethene	1,700	620	SW846 8240	10/06-10/08/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS		
1,2-Dichloroethane-d4	95	( 70 - 121)		
Toluene-d8	98	(81 - 117)		
Bromofluorobenzene	96	(74 - 121)		

NOTE: AS RECEIVED (NONE DETECTED)



1389 NASP S 9-29-92 3:00

WO #: 94579

LAB #: A2J050008-002

DATE RECEIVED: 10/05/92

MATRIX: SOLID

•	INORGANIC	ANALYTICAL	REPORT	٠

PARAMETER		REPORTIN LIMIT	_	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	85	0.5	x	USEPA 160.3	10/06-10/07/92	280021

MOTE: AS RECEIVED



1392 SASP 1 10-2-92 7:00

WO #: 94580101

LAB #: A2J050008-003

MATRIX: SOLID

DATE RECEIVED: 10/05/92

#### 

PARAMETER	RESULT (ug/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 640	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/07/92 10/06-10/07/92 10/06-10/07/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	SW846 8240	10/06-10/07/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	105 98	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	112	(74 - 121)

NOTE: AS RECEIVED ND (NONE DETECTED)



1392 SASP 1 10-2-92 7:00

WO #: 94580

LAB #: A2J050008-003

MATRIX: SOLID

DATE RECEIVED: 10/05/92

PARAMETER	RESULT	REPORTIN LIMIT		METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	90	0.5	*	USEPA 160.3	10/06-10/07/92	280022

NOTE: AS RECEIVED



1393 SASP 2 10-2-92 7:00

WO #: 94581101

LAB #: A2J050008-004

MATRIX: SOLID

DATE RECEIVED: 10/05/92

# ---- - REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/07/92 10/06-10/07/92 10/06-10/07/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	SW846 8240	10/06-10/07/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	99 99	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	105	( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



# 1393 SASP 2 10-2-92 7:00

WO #: 94581

LAB #: A2J050008-004

MATRIX: SOLID

DATE RECEIVED: 10/05/92

PARAMETER	RESULT	REPORTING LIMIT UN	<u>IT</u> <u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>	
Solids, Total (TS)	91	0.5	USEPA 160.3	10/06-10/07/92	280022	

HOTE: AS RECEIVED



1394 SASP 3 10-2-92 7:00

WO #: 94582101

LAB #: A2J050008-005 DATE RECEIVED: 10/05/92

MATRIX: SOLID

### ---- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 330 J	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/07/92 10/06-10/07/92 10/06-10/07/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	SW846 8240	10/06-10/07/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	100 97	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	119	(74 - 121)

NOTE: AS RECEIVED
NO (NONE DETECTED)

J (DETECTED, BUT BELOW QUANTITATION LIMIT: ESTIMATED VALUE)



# 1394 SASP 3 10-2-92 7:00

- - - - - - - - - INORGANIC ANALYTICAL REPORT - - - - - - -

WO #: 94582

PARAMETER

LAB #: A2J050008-005

MATRIX: SOLID

DATE RECEIVED: 10/05/92

	REPORTING		PREPARATION -	QC
RESULT	LIMIT UNIT	<u>METHOD</u>	ANALYSIS DATE	<b>BATCH</b>

Solids, Total (TS) 89 0.5 % USEPA 160.3 10/06-10/07/92 280022

MOTE: AS RECEIVED



1395 SASP 4 10-2-92 7:00

WO #: 94583101

LAB #: A2J050008-006

MATRIX: SOLID

DATE RECEIVED: 10/05/92

# ---- REQUESTED PARAMETERS -----

<u>PARAMETER</u>	RESULT (ug/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/07/92 10/06-10/07/92 10/06-10/07/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	SW846 8240	10/06-10/07/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	100	( 70 - 121)
Toluene-d8	99	( 81 - 117)
Bromofluorobenzene	103	( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



#### 1395 SASP 4 10-2-92 7:00

WO #: 94583

LAB #: A2J050008-006

MATRIX: SOLID

<u>PARAMETER</u>

DATE RECEIVED: 10/05/92

INO	RGANIC ANALYTICAL	REPORT		
	REPORTING		PREPARATION -	QC
RESULT	LIMIT UNIT	<u>METHOD</u>	ANALYSIS DATE	<u>BATCH</u>

90 0.5 % USEPA 160.3 10/06-10/07/92 280022 Solids, Total (TS)

NOTE: AS RECEIVED



1396 SASP 5 10-2-92 7:00

WO #: 94584101

LAB #: A2J050008-007

MATRIX: SOLID

DATE RECEIVED: 10/05/92

#### - - - - - - - REQUESTED PARAMETERS - - - - -

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 330 J	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/07/92 10/06-10/07/92 10/06-10/07/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	SW846 8240	10/06-10/07/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	90	( 70 - 121)
Toluene-d8	93 10=	(81 - 117)
Bromofluorobenzene	105	( 74 - 121)

NOTE: AS RECEIVED (NCME DETECTED)

<sup>(</sup>DETECTED, BUT BELOW QUANTITATION LIMIT; ESTIMATED VALUE)



1396 SASP 5 10-2-92 7:00

WO #: 94584

LAB #: A2J050008-007

MATRIX: SOLID

DATE RECEIVED: 10/05/92

INORGANIC	ANALYTICAL	REPORT
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PARAMETER	RESULT	REPORTING LIMIT		METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	90	0.5	x	USEPA 160.3	10/06-10/07/92	280022

NOTE: AS RECEIVED



1397 SASP 6 10-2-92 7:00

WO #: 94585101

LAB #: A2J050008-008

MATRIX: SOLID

DATE RECEIVED: 10/05/92

# 

PARAMETER	RESULT (ug/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/07/92 10/06-10/07/92 10/06-10/07/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	SW846 8240	10/06-10/07/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	93 96	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	99	(74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



# 1397 SASP 6 10-2-92 7:00

WO #: 94585

LAB #: A2J050008-008

DATE RECEIVED: 10/05/92

MATRIX: SOLID

_	INORG	ANIC	ANALVT	TCAT	REPORT
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PARAMETER		REPORTIN	_	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	91	0.5	x	USEPA 160.3	10/06-10/07/92	280022

NOTE: AS RECEIVED



1398 SASP 7 10-2-92 7:00

WO #: 94586101

LAB #: A2J050008-009

MATRIX: SOLID

DATE RECEIVED: 10/05/92

---- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 600 J	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/06-10/08/92 10/06-10/08/92 10/06-10/08/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	SW846 8240	10/06-10/08/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	108 104	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	104	( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)

<sup>(</sup>DETECTED, BUT BELOW QUANTITATION LIHIT; ESTINATED VALUE)



1398 SASP 7 10-2-92 7:00

WO #: 94586 LAB #: A2J050008-009

MATRIX: SOLID

DATE RECEIVED: 10/05/92

I	NORG/	ANIC	ANALY	ΓICAL	REPORT
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PARAMETER		REPORTING LIMIT	G <u>UNIT</u>	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	90	0.5	x	USEPA 160.3	10/06-10/07/92	280022

ROTE: AS RECEIPED



QUALITY CONTROL SECTION



### QUALITY CONTROL NARRATIVE

The results included in the report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicates (MS/MSDs) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch numbers indicated on the MS/MSD reports may not reflect the same batch numbers as those of the samples contained in the analytical report.

"DIL" in the analytical report means that due to high concentrations of analytes in the sample, a dilution was made and the surrogates or spiking compounds could not be quantitated.



### CHECK SAMPLE REPORT

QC BATCH: 282027

LAB #: A2J080000-027 C

MATRIX: SOLID

PREPARATION DATE: 10/06/92

DATE ANALYZED: 10/07/92

# ----- Volatile Organics, GC/MS ------

SPIKE PERCENT RECOVERY	Q/C LIMITS		
93 98 110 110	( 56-139) ( 79-128) ( 79-118) ( 78-122) ( 77-122)		
	PERCENT RECOVERY 93 98 110		



# CHECK SAMPLE REPORT

LAB #: A2J050008

INCREANTE	ANALYTICAL	DEDODT
INUMUANIC	ANALILICAL	REFURI

COMPOUND	SPIKE PERCENT RECOVERY	LIMITS	<u>MATRIX</u>	PREPARATION - ANALYSIS DATE	Q/C BATCH
Solids, Total (TS)	105	( 89-110)	SOLID	10/06-10/07/92	280021
Solids, Total (TS)	106	( 89-110)	SOLID	10/06-10/07/92	280022



# INTRA-LAB BLANK REPORT

LAB #: A2J080000-027

MATRIX: SOLID

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	10/06-10/07/92 10/06-10/07/92 10/06-10/07/92	282027 282027 282027
1,1,1-Trichloroethane	ND	620	10/06-10/07/92	282027

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	105 103 85	( 70 - 121) ( 81 - 117) ( 74 - 121)

NOTE:

ND (NONE DETECTED)



# INTRA-LAB BLANK REPORT

LAB #: A2J050008

PARAMETER	RESULT	REPORTI LIMIT		MATRIX	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>		
Solids, Total (TS) Solids, Total (TS)	ND ND	0.5 0.5	z z	SOLID SOLID	10/06-10/07/92 10/06-10/07/92	280021 280022		



### MATRIX SPIKE REPORT

QC BATCH: 266039

LAB #: A2I210005-004 S

MATRIX: SOLID

WO #: 91022

PREPARATION DATE: 9/22/92

DATE ANALYZED: 9/23/92

### 

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUF PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS
1,1-Dichloroethene	219	212	( 59-153)	3	( 0- 27)
Trichloroethene	90	88	(77-134)	3	( 0- 16)
Chlorobenzene	94	92	(77-122)	1	( 0- 20)
Toluene	92	92	(73-139)	1	( 0- 21)
Benzene	91	90	(81-127)	2	( 0- 19)

HER-SAYRE

# HATCHER-SAYRE, INC.

CONTRACT LAB	RELINQUISHED BY (SIGNATURE).	MC CVI- M. W. W. H.	BAIL N CHUMAN		1398 SASP7 19442 8861	6			10/2/12	1393 Sysp 2 192/2		MSP S 9/29/12	1388 NASPN 1/29/92	HATCHER-SAYRE, INC. DATE	PRINTED NAME TO THE WAR TO THE		SAMPLER'S SIGNATURE	PROJECT HOWE Valley	
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WADSWORTH/ Division of Enseco Incorporated Laboratories

Corporate and Laboratory:

4101 Source Drive, NV. North Canth: OH 44721

21(-497-939) FAX: 216-497-0770

### ANALYTICAL REPORT

PROJECT NO. 0064-001

HOWE-VALLEY

Presented to:

JIM KNAUSS

HATCHER SAYRE, INC.

WADSWORTH/ALERT LABORATORIES

Alesia M. Danford Project Manager

Mark P. Nebiolo Laboratory Manager

Mark P. Nebrolo

October 20, 1992



### PROJECT NARRATIVE

The following report contains the analytical results for eight water samples and one Quality Control sample submitted to WADSWORTH/ALERT Laboratories by Hatcher Sayre, Inc., from the Howe-Valley site, project number 0064-001. The samples were received October 9, 1992, according to documented sample acceptance procedures.

WADSWORTH/ALERT Laboratories utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the end of the report.



### ANALYTICAL METHODS SUMMARY

Wadsworth/ALERT Laboratories utilizes only USEPA approved methods in analytical work. The methods used for the analyses presented in the following report are listed below.

### **Parameters**

<u>Methods</u>

Volatile Organics, GC/MS Solids, Total (TS) SW846 8240 USEPA 160.3 MODIFIED

### References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical

Methods", Third Edition, September, 1986-

USEPA 600/4-79-02, "Methods for Chemical Analysis of Water and

Wastes", March, 1983.



# SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

<u>WO #</u>	LABORATORY ID	SAMPLE IDENTIFICATION
95440	A2J090007-001	1403 SASP-3 10-7-92 8:30AM
95441	A2J090007-002	1404 SASP-3 (E) 10-7-92 8:30AM
95442	A2J090007-003	1405 NASP-2 NW 10-7-92 9:30AM
95443	A2J090007-004	1406 NASP-2 SW 10-7-92 9:30AM
95444	A2J090007-005	1407 NASP-2 NE 10-7-92 9:30AM
95445	A2J090007-006	1408 NASP-2 SE 10-7-92 9:30AM
95446	A2J090007-007	1409 NASP-3 (N) 10-7-92 6:00PM
95447	A2J090007-008	1410 NASP-3 (S) 10-7-92 6:00PM
95449	A2J090007-009	1414 TRIP BLANK 10-7-92



1403 SASP-3 10-7-92 8:30AM

WO #: 95440101

LAB #: A2J090007-001

MATRIX: SOLID

DATE RECEIVED: 10/09/92

### - - - - - REQUESTED PARAMETERS - - - - -

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1.1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 71,000	6,200 6,200 <b>6,200</b>	SW846 8240 SW846 8240 SW846 8240	10/12-10/13/92 10/12-10/13/92 10/12-10/13/92	288015 288015 288015
1,1,1-Trichloroethane	ND	6,200	SW846 8240	10/12-10/13/92	288015

SURROGATE RECOVERY	<u>x</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	116 104	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	176*	(74 - 121)

ROTE: AS RECEIVED (BONE DETECTED)





### HATCHER SAYRE

1403 SASP-3 10-7-92 8:30AM

WO #: 95440

LAB #: A2J090007-001

DATE RECEIVED: 10/09/92

MATRIX: SOLID

-	INORGANIC	ANALYTICAL	REPORT
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PARAMETER	RESULT	REPORTIN LIMIT		METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	86	0.5	x	USEPA 160.3	10/12-10/13/92	286014

NOTE: AS RECEIVED



1404 SASP-3 (E) 10-7-92 8:30AM

WO #: 95441101

LAB #: A2J090007-002

MATRIX: SOLID

DATE RECEIVED: 10/09/92

### 

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 11,000	620 620 <b>620</b>	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	ND	620	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>x</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	111 99	( 70 - 121) ( 81 - 117)
Bromofluorohenzene	121	(74 - 121)

NOTE: AS RECEIVED (NOWE DETECTED)



### HATCHER SAYRE

1404 SASP-3 (E) 10-7-92 8:30AM

WO #: 95441

LAB #: A2J090007-002

MATRIX: SOLID

DATE RECEIVED: 10/09/92

		REPORTING		PREPARATION -	QC
PARAMETER	RESULT	LIMIT UNIT	<u>METHOD</u>	ANALYSIS DATE	<u>BATCH</u>
Solids, Total (TS)	79	0.5 %	USEPA 160.3	10/12-10/13/92	286014

NOTE: AS RECEIVED



1405 NASP-2 NW 10-7-92 9:30AM

WO #: 95442101

LAB #: A2J090007-003 DATE RECEIVED: 10/09/92

MATRIX: SOLID

---- REQUESTED PARAMETERS -----

<u>PARAMETER</u>	RESULT (ug/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	ND	620	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>*</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	107 109	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	109	( 74 - 121)

HOTE: AS RECEIVED

(HOME DETECTED)



6 8 0196

### HATCHER SAYRE

1405 NASP-2 NW 10-7-92 9:30AM

WO #: 95442

LAB #: A2J090007-003

MATRIX: SOLID

DATE RECEIVED: 10/09/92

<ul> <li>INORGANIC</li> </ul>	ANALYTICAL	REPORT
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PARAMETER	RESULT	REPORTIN	_	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	91	0.5	x	USEPA 160.3	10/12-10/13/92	286014

MOTE: AS RECEIVED



1406 NASP-2 SW 10-7-92 9:30AM

WO #: 95443101

LAB #: A2J090007-004

MATRIX: SOLID

DATE RECEIVED: 10/09/92

### ---- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	ND	620	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>*</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	113 107 106	( 70 - 121) ( 81 - 117) ( 74 - 121)

HOTE: AS RECEIVED (NORE DETECTED)



### HATCHER SAYRE

### 1406 NASP-2 SW 10-7-92 9:30AM

WO #: 95443

LAB #: A2J090007-004

MATRIX: SOLID

DATE RECEIVED: 10/09/92

- INORGANIC	ANALYTICAL	REPORT
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PARAMETER	RESULT	REPORTIN LIMIT		<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	90	0.5	x	USEPA 160.3	10/12-10/13/92	286014

NOTE: AS RECEIVED



# 1407 NASP-2 NE 10-7-92 9:30AM

**WO #:** 95444101

LAB #: A2J090007-005 DATE RECEIVED: 10/09/92

MATRIX: SOLID

### ---- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	<b>Q</b> C <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	ND	620	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>*</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	120 106	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	107	(74 - 121)

HOTE: AS RECEIVED

HD (HOME DETECTED)



### HATCHER SAYRE

### 1407 NASP-2 NE 10-7-92 9:30AM

WO #: 95444

LAB #: A2J090007-005

MATRIX: SOLID

DATE RECEIVED: 10/09/92

PARAMETER	RESULT	REPORTING LIMIT UNIT	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	91	0.5 %	USEPA 160.3	10/12-10/13/92	286014

HOTE: AS RECEIVED



### 1408 NASP-2 SE 10-7-92 9:30AM

WO #: 95445101

LAB #: A2J090007-006 DATE RECEIVED: 10/09/92

MATRIX: SOLID

---- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg_)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	ND	620	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>z</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	107	( 70 - 121)
Toluene-d8	101	( 81 - 117)
Bromofluorobenzene	102	( 74 - 121)

NOTE: AS RECEIVED

(NOME DETECTED)



### HATCHER SAYRE

### 1408 NASP-2 SE 10-7-92 9:30AM

WO #: 95445 LAB #: A2J090007-006

MATRIX: SOLID

DATE RECEIVED: 10/09/92

_	INORGANIC	ANALYTIC	CAT.	REPORT
_	THOMOMIT	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		

PARAMETER	RESULT	REPORTIN	_	METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	90	0.5	x	USEPA 160.3	10/12-10/13/92	286014

MOTE: AS RECEIVED



1409 NASP-3 (N) 10-7-92 6:00PM

WO #: 95446101

LAB #: A2J090007-007 DATE RECEIVED: 10/09/92

MATRIX: SOLID

--- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND 440 J 14,000	620 620 620	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	520 J	620	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	110 104	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	142*	(74 - 121)

HOTE: AS RECEIVED
HD (HOME DETECT.

J (DETECTED, BUT BELOW QUARTITATION LIMIT: ESTIMATED VALUE)



### HATCHER SAYRE

# 1409 NASP-3 (N) 10-7-92 6:00PM

WO #: 95446

LAB #: A2J090007-007

MATRIX: SOLID

DATE RECEIVED: 10/09/92

INORGANIC	ANALYTICAL	REPORT	•

<u>PARAMETER</u>	RESULT	REPORTI LIMIT	·	<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	83	0.5	x	USEPA 160.3	10/12-10/13/92	286014

NOTE: AS RECEIVED



1410 NASP-3 (S) 10-7-92 6:00PM

WO #: 95447101

LAB #: A2J090007-008

MATRIX: SOLID

DATE RECEIVED: 10/09/92

# 

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 74,000	6,200 6,200 <b>6,200</b>	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	60,000	6,200	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>x</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	118 102 150*	( 70 - 121) ( 81 - 117) ( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



### HATCHER SAYRE

# 1410 NASP-3 (S) 10-7-92 6:00PM

WO #: 95447

LAB #: A2J090007-C08

MATRIX: SOLID

DATE RECEIVED: 10/09/92

INORGANIC	ANALYTICAL	REPORT

		REPORTIN	G		PREPARATION -	QC
PARAMETER	RESULT	LIMIT	UNIT	<u>METHOD</u>	ANALYSIS DATE	<u>BATCH</u>
Solids, Total (TS)	80	0.5	x	USEPA 160.3	10/12-10/13/92	286014

NOTE: AS RECEIVED



# 1414 TRIP BLANK 10-7-92

₩O #: 95449101

LAB #: A2J090007-009 DATE RECEIVED: 10/09/92

MATRIX: WATER

---- REQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/L )	REPORTINGLIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND ND	5.0 5.0 5.0	SW846 8240 SW846 8240 SW846 8240	10/12/92 10/12/92 10/12/92	288015 288015 288015
1,1,1-Trichloroethane	ND	5.0	SW846 8240	10/12/92	288015

SURROGATE RECOVERY	<u>*</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	101 99 102	( 76 - 114) ( 88 - 110) ( 86 - 115)

NOTE: AS RECEIVED

[NORE DETECTED]



QUALITY CONTROL SECTION



### QUALITY CONTROL NARRATIVE

The results included in the report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicates (MS/MSDs) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch numbers indicated on the MS/MSD reports may not reflect the same batch numbers as those of the samples contained in the analytical report.

Check and Blank numbers 93012 and 93013 are associated with batch number 288015 in the analytical report requested for Volatile Organic Compounds analysis.



# QUALITY ASSURANCE/QUALITY CONTROL PROGRAM ELEMENTS

WADSWORTH/ALERT Laboratories conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data.

Quality control samples provide a mechanism for assessing the overall quality of the analytical process and can be used to indicate the useability of the analytical data. These QC samples include check samples, method blanks, matrix spikes and surrogate spikes.

The CHECK SAMPLE is used to demonstrate that all laboratory analytical processes were functioning properly when the associated sample batch was prepared and analyzed. The check sample is a simulated sample spiked with representative analytes prepared and analyzed with a batch of samples. Spike recovery values from this check sample must meet laboratory established acceptance criteria.

The METHOD BLANK is used to measure the level of any background contamination in the laboratories analytical system. The method blank is carried through the entire process, including the preparation, and consists of all of the reagents specific to the method.

All analytes of interest in the method blank for organic analyses must be below the method detection limits except for the following compounds:

### **Volatiles**

Methylene chloride 2-Butanone Acetone

### Semivolatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate
Di-n-octyl phthalate

These commonly-detected laboratory contaminants may be present in the method blank at up to five times the method reporting limit.

For metals analyses, if any analyte concentration in the method blank is above the method reporting limit, then the lowest concentration of that analyte in the associates samples must be ten times the blank concentration. Otherwise, all samples associated with the blank which are less than ten times the blank are redigested and reanalyzed.

The laboratory performs MATRIX SPIKES (MS) and MATRIX SPIKE DUPLICATES (MSD) to indicate any matrix effects within a given sample. They also allow the laboratory to gather precision and bias data for a specific method and matrix.



Since matrix effects may bias percent recovery, the laboratory performs corrective action if the precision (RPD) criteria of the MS/MSD is not met.

SURROGATE SPIKES are used by the laboratory to indicate method bias introduced by the sample matrix during the preparation and analysis of a specific method. Surrogates are normally organic compounds similar to those being analyzed for the GC or GC/MS. If surrogate recoveries fail to meet laboratory acceptance criteria it does not necessarily indicate poor laboratory control but may in fact be attributed to a sample matrix effect. In the event that surrogates fail criteria, a repreparation and reanalysis is performed to determine the presence of a matrix effect.

The laboratory uses the following surrogate recovery criteria for all organic analyses:

For the GC/MS Base/Neutral fraction the surrogate criteria requires that two of the three surrogates must meet recovery limits. The third surrogate must have a recovery of ten percent or greater.

For the GC/MS Acid fraction the surrogate criteria requires that two of the three surrogates must meet recovery limits. The third surrogate must have a recovery of ten percent or greater.

For GC/ECD Pesticides, the surrogate criteria requires that one of the two surrogates must meet recovery limits.

For Volatiles, PCBs and Herbicides all surrogates utilized must meet surrogate recovery limits.



# CHECK SAMPLE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
	GC/MS VOLATILE COMPOUNDS			
93012	Acetone	83	SOLID	( * )
	Benzene	92		(66-142)
	Bromodichloromethane	94		( * )
	Bromoform	105		(55-138)
	Bromomethane	78		( * )
	2-Butanone	86		( * )
	Carbon Disulfide	* 88		( * )
	Carbon Tetrachloride	97		( * )
	Chlorobenzene	98		(60-133)
	Chlorodibromomethane	97		( * )
	Chloroethane	76		( * )
	Chloroform	92		( * )
	Chloromethane	85		(50~140)
	1,1-Dichloroethane	91		( * )
	1,2-Dichloroethane	90		( * )
	1,1-Dichloroethene	86		(59~172)
	cis-1,2-Dichloroethene	92		( * )
	trans-1,2-Dichloroethene	96		( * )
	1,2-Dichloropropane	93		( * )
	cis-1,3-Dichloropropene	97		( * )
	trans-1,3-Dichloropropene	96		( * )
	Ethylbenzene	100		(69~123)
	2-Hexanone	89		( * )
	Methylene Chloride	92		( * )
	4-Methy1-2-Pentanone	92		( * )
	Styrene	100		( * )
	1,1,2,2-Tetrachloroethane	98		(45-145)
	Tetrachloroethene	100		( * )
	Toluene	95		(59-139)
	1,1,1-Trichloroethane	93		( * )
	1,1,2-Trichloroethane	96		( * )
	Trichloroethene	95		(62-137)
	Vinyl Chloride	84		( * )
	m-Xylene & p-Xylene	96		(71-123)
	o-Xylene	96		(71-123)

NOTE: ( \* ) - Check Sample Recovery ranges unavailable.



### CHECK SAMPLE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
	GC/MS VOLATILE COMPOUNDS			
93013	Acetone	102	SOLID	( * )
	Benzene	95		(66-142)
	Bromodichloromethane	98		( * )
	Bromoform	100		(55-138)
	Bromomethane	101	•	( * )
	2-Butanone	96		( * )
	Carbon Disulfide	96		( * )
	Carbon Tetrachloride	94		( * )
	Chlorobenzene	95		(60-133)
	Chlorodibromomethane	100		( * )
	Chloroethane	81		( * )
	Chloroform	98		( * )
	Chloromethane	120		(50-140)
	1,1-Dichloroethane	98		( * )
	1,2-Dichloroethane	97		( * )
	1,1-Dichloroethene	100		(59-172)
	cis-1,2-Dichloroethene	98		( * )
	trans-1,2-Dichloroethene	96		( * )
	1,2-Dichloropropane	97		( * )
	cis-1,3-Dichloropropene	99		( * )
	trans-1,3-Dichloropropene	99		( * )
	Ethylbenzene	98		(69-123)
	2-Hexanone	97		( * )
	Methylene Chloride	91		( * )
	4-Methy1-2-Pentanone	100		( * )
	Styrene	96		( * )
	1,1,2,2-Tetrachloroethane	96		(45-145)
	Tetrachloroethene	95		( * )
	Toluene	96		(59-139)
	1,1,1-Trichloroethane	90		( * )
	1,1,2-Trichloroethane	97		( * )
	Trichloroethene	98		(62-137)
	Vinyl Chloride	96		(*)
	m-Xylene & p-Xylene	95		(71-123)
	o-Xylene	96		(71-123)
	, .u	• •		(11 120)

NOTE: ( \* ) - Check Sample Recovery ranges unavailable.



# CHECK SAMPLE REPORT

LAB #: A2J090007

- - - - - - INORGANIC ANALYTICAL REPORT - - - - -

SPIKE PERCENT COMPOUND RECOVERY		LIMITS	PREPARATION - ANALYSIS DATE	Q/C BATCH	
Solids, Total (TS)	99	( 89-110)	SOLID	10/12-10/13/92	286014



COMPANY: Wadsworth/Alert Laboratories

DATE RECEIVED:

LAB #:

9192-91013

DATE EXTRACTED:

NA

MATRIX: WATER

DATE ANALYZED: 10/13/92

SAMPLE ID: INTRA-LAB BLANK, 10/13/92

### VOLATILE ORGANIC COMPOUNDS BLANK REPORT METHOD 8240 LIST - GC/MS

PARAMETER	RESULT (ug/1)	DETECTION LIMIT	
1,1-Dichlorosthans 1,2-Dichlorosthens, Total Tetrachlorosthens	ND ND ND	5.0 6.0 5.0	
1,1,1-Trichloroethane	ND	5.0	

NOTE: ND (None Detected)

(Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE	LIMITS	*
	WATER	SOLID	
1,2-Dichloroethane-d4	(76-114)	(70-121)	108
Toluene-d8	(88-110)	(81-117)	98
8romoflugrobenzene	(86-115)	(74-121)	96



COMPANY: Wadsworth/Alert Laboratories

DATE RECEIVED: NA DATE EXTRACTED: NA

LAB #: 939 MATRIX: SO

9392-93012 SOLID

DATE ANALYZED: 10/12/92

SAMPLE ID: INTRA-LAB BLANK, 10/12/92

#### VOLATILE ORGANIC COMPOUNDS BLANK REPORT METHOD 8240 - GC/MS

PARAMETER RESULT (ug/kg) DETECTION LIMIT

1,1-Dichloroethane ND 620
1,2-Dichloroethene, Total ND 620
Tetrachloroethene ND 620

1,1,1-Trichloroethane ND 620

NOTE: ND (None Detected)

J (Detected, but below quantitation limit; estimated value)

B (Compound detected in method blank associated with this sample)

-- (Not Analyzed)

SURROGATE RECOVERY:	ACCEPTABL	E LIMITS	*
	WATER	SOLID	
1,2-Dichloroethane-d4	(76-114)	(70-121)	110
Toluene-d8	(88-110)	(81-117)	103
Bromofluorobenzene	(86-115)	(74-121)	103



Wadsworth/Alert Laboratories COMPANY:

DATE RECEIVED: NA DATE EXTRACTED: NA

LAB #: 9392-93013 MATRIX: SOLID

Tetrachloroethene

1,1,1-Trichloroethane

DATE ANALYZED: 10/13/92

5.0

SAMPLE ID: INTRA-LAB BLANK, 10/13/92

#### **VOLATILE ORGANIC COMPOUNDS BLANK REPORT** METHOD 8240 - GC/MS

RESULT (ug/kg) DETECTION LIMIT **PARAMETER** 5.0 ND 1,1-Dichloroethane ND 5.0 1,2-Dichloroethene, Total 5.0

ND

ND

NOTE: ND (None Detected)

(Detected, but below quantitation limit; estimated value) J

(Compound detected in method blank associated with this sample) В

(Not Analyzed)

SURROGATE RECOVERY:	ACCEPTABL	E LIMITS	X
	WATER	SOLID	
1,2-Dichloroethane-d4	(76-114)	(70-121)	108
Toluene-d8	(88-110)	(81-117)	98
Bromofluorobenzene	(86-115)	(74-121)	96



# CHAIN OF CUSTODY RECORD

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## MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
	GC/MS VOLATILE COMP	DUNDS			
64061	1,1-Dichloroethene	120	111	SOLID	(59-172)
	Trichloroethene	98	106		(62-137)
	Benzene	102	108		(60-133)
	Toluene	99	104		(59-139)
	Chlorobenzene	102	111		(66-142)



LAB #: A2J090007

	INORG	ANIC ANALYTIC	AL REPO	)RT		
PARAMETER	RESULT	REPORTING LIMIT	UNIT	MATRIX	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	ND	0.5	x	SOLID	10/12-10/13/92	286014



WADSWORTH/ .... Laboratories Division of Enseco Incorporated

Corporate and Laboratory:

4101 Shuffel Drive, NW North Canton, OH 44720 216-497-9396 FAX 216-497-0772

#### ANALYTICAL REPORT

PROJECT NO. 0064-001 HOWE-VALLEY

Presented to:

Paul Weaver

HATCHER SAYRE, INC.

WADSWORTH/ALERT LABORATORIES

Alesia M. Nauford

Alesia M. Danford

Project Manager

Mark P. Nebrolo-

Mark P. Nebiolo Laboratory Manager

November 4, 1992



#### ANALYTICAL METHODS SUMMARY

Wadsworth/ALERT Laboratories utilizes only USEPA approved methods in analytical work. The methods used for the analyses presented in the following report are listed below.

#### <u>Parameters</u>

Methods

Volatile Organics, GC/MS Solids, Total (TS) SW846 8240 USEPA 160.3 MODIFIED

#### References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986.

USEPA 600/4-79-02, "Methods for Chemical Analysis of Water and Wastes", March, 1983.



#### SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

<u>WO #</u>	LABORATORY ID	SAMPLE IDENTIFICATION
98794	A2J270006-001	1424SASP(3A) 10-23-92 2:15
98795	A2J270006-002	1425SASP(3B) 10-23-92 2:15
98796	A2J270006-003	1426SASP(3C) 10-23-92 2:15
98797	A2J270006-004	1428NASP#4(N) 10-23-92 2:40
98798	A2J270006-005	1429NASP#4(S) 10-23-92 2:40
98799	A2J270006-006	1430NASP#3A(NE) 10-26-92 4:30
98800	A2J270006-007	1431NASP#3A(NW) 10-26-92 4:30
98801	A2J270006-008	1432NASP#3A(SE) 10-26-92 4:30
98803	A2J270006-009	1433NASP#3A(SW) 10-26-92 4:30



1424SASP(3A) 10-23-92 2:15

WO #: 98794101

LAB #: A2J270006-001

MATRIX: SOLID

• DATE RECEIVED: 10/27/92

#### ----- PEQUESTED PARAMETERS -----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 44	12 12 12	SW846 8240 SW846 8240 SW846 8240	10/28/92 10/28/92 10/28/92	303046 303046 <b>303046</b>
1,1,1-Trichloroethane	ND	12	SW846 8240	10/28/92	303046

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	97 110	( 70 - 121) ( 81 - 117)
Bromofluorobenzene	231*	(74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)

<sup>\*</sup> SURBOGATE(S) OUTSIDE ACCEPTANCE CRITERIA DUE TO DEMONSTRATED MATRIX EFFECT.



1424SASP(3A) 10-23-92 2:15

WO #: 98794

LAB #: A2J270006-001

MATRIX: SOLID

DATE RECEIVED: 10/27/92

INORGANIO ANADILIONE RELOGI	INORGANIC A	ANALYTICAL	REPORT
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PARAMETER	RESULT	REPORTIN		METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	94	0.5	x	USEPA 160.3	10/28-10/29/92	303004

BOTE: AS RECEIVED



1425SASP(3B) 10-23-92 2:15

WO #: 98795101

LAB #: A2J270006-002

MATRIX: SOLID

DATE RECEIVED: 10/27/92

#### ----- REQUESTED PARAMETERS -----

<u>PARAMETER</u>	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC <u>BATCH</u>
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 18	7 7 7	SW846 8240 SW846 8240 SW846 8240	10/29/92 10/29/92 10/29/92	303057 303057 <b>303057</b>
1,1,1-Trichloroethane	ND	7	SW846 8240	10/29/92	303057

SURROGATE RECOVERY	<u><b>%</b></u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene	99 122* 209*	( 70 - 121) ( 81 - 117) ( 74 - 121)

NOTE: AS RECEIVED (NONE DETECTED)

<sup>\*</sup> SURROGATE(S) OUTSIDE ACCEPTANCE CRITERIA DUE TO DEMONSTRATED MATRIX EFFECT.



# 1425SASP(3B) 10-23-92 2:15

WO #: 98795

LAB #: A2J270006-002

MATRIX: SOLID

DATE RECEIVED: 10/27/92

INORGANIC	ANALYTICAL	REPORT
TINDIGOUNITO	MINDI LI UND	

PARAMETER		REPORTIN LIMIT		<u>METHOD</u>	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>
Solids, Total (TS)	93	0.5	x	USEPA 160.3	10/28-10/29/92	303004

MOTE: AS RECEIVED



1426SASP(3C) 10-23-92 2:15

WO #: 98796101

LAB #: A2J270006-003 DATE RECEIVED: 10/27/92

MATRIX: SOLID

### ---- REQUESTED PARAMETERS ----

PARAMETER	RESULT (ug/kg)	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC BATCH
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 16	5 5 5	SW846 8240 SW846 8240 SW846 8240	10/28/92 10/28/92 10/28/92	303046 303046 303046
1,1,1-Trichloroethane	ND	5	SW846 8240	10/28/92	303046

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4	92	( 70 - 121)
Toluene-d8	115	(81 - 117)
Bromofluorobenzene	146*	(74 - 121)

NOTE: AS RECEIVED
NO (NONE DETECT

<sup>\*</sup> SURROGATE(S) OUTSIDE ACCEPTANCE CRITERIA DUE TO DEMONSTRATED MATRIX EFFECT.





1426SASP(3C) 10-23-92 2:15

WO #: 98796

LAB #: A2J270006-003

DATE RECEIVED: 10/27/92

MATRIX: SOLID

PARAMETER	RESULT	REPORTI LIMIT		METHOD	PREPARATION - ANALYSIS DATE	QC <u>BATCH</u>	
Solids, Total (TS)	93	0.5	x	USEPA 160.3	10/28-10/29/92	303004	

HOTE: AS RECEIVED

DATE RECEIVED: 10/27/92



#### HATCHER SAYRE, INC.

1428NASP#4(N) 10-23-92 2:40

WO #: 98797101

LAB #: A2J270006-004

MATRIX: SOLID

----- REQUESTED PARAMETERS ------

PARAMETER	RESULT (ug/kg )	REPORTING LIMIT	METHOD	EXTRACTION- ANALYSIS DATE	QC BATCH
1,1-Dichloroethane 1,2-Dichloroethene, Total Tetrachloroethene	ND ND 240,000	16,000 16,000 16,000	SW846 8240 SW846 8240 SW846 8240	10/28-10/30/92 10/28-10/30/92 10/28-10/30/92	307037 307037 307037
1,1,1-Trichloroethane	ND	16,000	SW846 8240	10/28-10/30/92	307037

SURROGATE RECOVERY	<u>%</u>	ACCEPTABLE LIMITS
1,2-Dichloroethane-d4 Toluene-d8	DIL DIL	( 70 - 121) ( 81 - 117) ( 74 - 121)
Bromofluorobenzene	קדני	( 14 - 121)

NOTE: AS RECEIVED (NONE DETECTED)



1428NASP#4(N) 10-23-92 2:40

WO #: 98797

LAB #: A2J270006-004

DATE RECEIVED: 10/27/92

MATRIX: SOLID

- - - - - - - - - - - - - INORGANIC ANALYTICAL REPORT - - - - - -

| <u>PARAMETER</u>   | RESULT | REPORTIN<br>LIMIT | G<br><u>UNIT</u> | METHOD      | PREPARATION - ANALYSIS DATE | QC<br><u>BATCH</u> |
|--------------------|--------|-------------------|------------------|-------------|-----------------------------|--------------------|
| Solids, Total (TS) | 79     | 0.5               | x                | USEPA 160.3 | 10/28-10/29/92              | 303004             |

MOTE: AS RECEIVED



1429NASP#4(S) 10-23-92 2:40

₩O #: 98798

LAB #: A2J270006-005

DATE RECEIVED: 10/27/92

MATRIX: SOLID

----- INORGANIC ANALYTICAL REPORT -----

| PARAMETER          |    | REPORTIN<br>LIMIT |   | METHOD      | PREPARATION - ANALYSIS DATE | QC<br><u>BATCH</u> |
|--------------------|----|-------------------|---|-------------|-----------------------------|--------------------|
| Solids, Total (TS) | 81 | 0.5               | x | USEPA 160.3 | 10/28-10/29/92              | 303004             |

MOTE: AS RECEIVED



1430NASP#3A(NE) 10-26-92 4:30

WO #: 98799101

LAB #: A2J270006-006 DATE RECEIVED: 10/27/92

MATRIX: SOLID

---- REQUESTED PARAMETERS -----

| PARAMETER                                                            | RESULT (ug/kg) | REPORTING<br>LIMIT    | METHOD                                 | EXTRACTION-<br>ANALYSIS DATE     | QC<br><u>BATCH</u>                |
|----------------------------------------------------------------------|----------------|-----------------------|----------------------------------------|----------------------------------|-----------------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>32 | 25<br>25<br><b>25</b> | SW846 8240<br>SW846 8240<br>SW846 8240 | 10/28/92<br>10/28/92<br>10/28/92 | 303046<br>303046<br><b>303046</b> |
| 1,1,1-Trichloroethane                                                | ND             | 25                    | SW846 8240                             | 10/28/92                         | 303046                            |

| SURROGATE RECOVERY            | <u><b>%</b></u> | ACCEPTABLE LIMITS          |
|-------------------------------|-----------------|----------------------------|
| 1,2-Dichloroethane-d4         | 107<br>159*     | ( 70 - 121)                |
| Toluene-d8 Bromofluorobenzene | 187*            | ( 81 - 117)<br>( 74 - 121) |

NOTE: AS RECRIVED
NO (NONE DETECTED)

<sup>\*</sup> SURROGATE(S) OUTSIDE ACCEPTANCE CRITERIA DUE TO DEMONSTRATED MATRIX EFFECT.



1430NASP#3A(NE) 10-26-92 4:30

WO #: 98799

LAB #: A2J270006-006

DATE RECEIVED: 10/27/92

MATRIX: SOLID

| <u>PARAMETER</u>   | RESULT | REPORTIN<br>LIMIT | - | METHOD      | PREPARATION - ANALYSIS DATE | <b>Q</b> C<br><u>BATCH</u> |
|--------------------|--------|-------------------|---|-------------|-----------------------------|----------------------------|
| Solids, Total (TS) | 94     | 0.5               | x | USEPA 160.3 | 10/28-10/29/92              | 303004                     |

NOTE: AS RECEIVED



1431NASP#3A(NW) 10-26-92 4:30

WO #: 98800101

LAB #: A2J270006-007 DATE RECEIVED: 10/27/92

MATRIX: SOLID

#### ---- REQUESTED PARAMETERS ----

| PARAMETER                                                            | RESULT (ug/kg ) | REPORTING LIMIT | METHOD                                 | EXTRACTION-<br>ANALYSIS DATE     | QC<br><u>BATCH</u>         |
|----------------------------------------------------------------------|-----------------|-----------------|----------------------------------------|----------------------------------|----------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>19  | 12<br>12<br>12  | SW846 8240<br>SW846 8240<br>SW846 8240 | 10/28/92<br>10/28/92<br>10/28/92 | 303046<br>303046<br>303046 |
| 1,1,1-Trichloroethane                                                | ND              | 12              | SW846 8240                             | 10/28/92                         | 303046                     |

| SURROGATE RECOVERY               | <u><b>%</b></u> | ACCEPTABLE LIMITS          |
|----------------------------------|-----------------|----------------------------|
| 1,2-Dichloroethane-d4 Toluene-d8 | 104<br>130*     | ( 70 - 121)<br>( 81 - 117) |
| Bromofluorobenzene               | 218*            | (74 - 121)                 |

NOTE: AS RECEIVED
NO (NONE DETECTED)

<sup>\*</sup> SURROGATE(S) OUTSIDE ACCEPTANCE CRITERIA DUE TO DEMONSTRATED MATRIX EFFECT.



# 1431NASP#3A(NW) 10-26-92 4:30

**WO #:** 98800

LAB #: A2J270006-007

MATRIX: SOLID

DATE RECEIVED: 10/27/92

| · INORGANIC ANALYTICAL REPO | )IC 1 |
|-----------------------------|-------|
|-----------------------------|-------|

| <u>PARAMETER</u>   |    | REPORTIN<br>LIMIT | _ | METHOD      | PREPARATION - ANALYSIS DATE | QC<br><u>BATCH</u> |
|--------------------|----|-------------------|---|-------------|-----------------------------|--------------------|
| Solids, Total (TS) | 93 | 0.5               | x | USEPA 160.3 | 10/28-10/29/92              | 303004             |

BOTE: AS RECEIVED



1432NASP#3A(SE) 10-26-92 4:30

WO #: 98801101

LAB #: A2J270006-008

MATRIX: SOLID

DATE RECEIVED: 10/27/92

#### - - - REQUESTED PARAMETERS -

| PARAMETER                                                            | RESULT (ug/kg)   | REPORTING LIMIT | METHOD                                 | EXTRACTION-<br>ANALYSIS DATE     | QC<br><u>BATCH</u>                 |
|----------------------------------------------------------------------|------------------|-----------------|----------------------------------------|----------------------------------|------------------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>38 J | 50<br>50<br>50  | SW846 8240<br>SW846 8240<br>SW846 8240 | 10/28/92<br>10/28/92<br>10/28/92 | 303046<br>303046<br><b>30304</b> 6 |
| 1,1,1-Trichloroethane                                                | ND               | 50              | SW846 8240                             | 10/28/92                         | 303046                             |

| SURROGATE RECOVERY               | <u><b>%</b></u> | ACCEPTABLE LIMITS          |
|----------------------------------|-----------------|----------------------------|
| 1,2-Dichloroethane-d4 Toluene-d8 | 95<br>135*      | ( 70 - 121)<br>( 81 - 117) |
| Bromofluorobenzene               | 184*            | (74 - 121)                 |

NOTE: AS RECEIVED MD (NOWE DETECTED)

<sup>\*</sup> SURROGATE(S) OUTSIDE ACCEPTANCE CRITERIA DUB TO DEMONSTRATED MATRIX EFFECT.

<sup>(</sup>DETECTED, BUT BELOW QUANTITATION LIMIT; ESTIMATED VALUE)



6 8 0238

## HATCHER SAYRE, INC.

1432NASP#3A(SE) 10-26-92 4:30

WO #: 98801

LAB #: A2J270006-008

MATRIX: SOLID

DATE RECEIVED: 10/27/92

| INORG   | ANTC | ANAT. | YTICAL | REPORT |
|---------|------|-------|--------|--------|
| TINOTEO | mil  | лили  |        |        |

| PARAMETER          | RESULT | REPORTI | · · · | <u>METHOD</u> | PREPARATION -<br>ANALYSIS DATE | QC<br>BATCH |
|--------------------|--------|---------|-------|---------------|--------------------------------|-------------|
| Solids, Total (TS) | 95     | 0.5     | x     | USEPA 160.3   | 10/28-10/29/92                 | 303004      |

HOTE: AS RECEIVED



1433NASP#3A(SW) 10-26-92 4:30

WO #: 98803101

LAB #: A2J270006-009

MATRIX: SOLID

DATE RECEIVED: 10/27/92

#### ---- REQUESTED PARAMETERS -----

| PARAMETER                                                            | RESULT (ug/kg)   | REPORTING<br>LIMIT | METHOD                                 | EXTRACTION-<br>ANALYSIS DATE     | QC<br>BATCH                |
|----------------------------------------------------------------------|------------------|--------------------|----------------------------------------|----------------------------------|----------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>46 J | 50<br>50<br>50     | SW846 8240<br>SW846 8240<br>SW846 8240 | 10/28/92<br>10/28/92<br>10/28/92 | 303046<br>303046<br>303046 |
| 1,1,1-Trichloroethane                                                | ND               | 50                 | SW846 8240                             | 10/28/92                         | 303046                     |

| SURROGATE RECOVERY    | <u>%</u> | ACCEPTABLE LIMITS |
|-----------------------|----------|-------------------|
| 1,2-Dichloroethane-d4 | 97       | ( 70 - 121)       |
| Toluene-d8            | 159*     | (81 - 117)        |
| Bromofluorobenzene    | 182*     | ( 74 - 121)       |

NOTE: AS RECEIVED (NONE DETECTED)

\* SURROGATE(S) OUTSIDE ACCEPTANCE CRITERIA DUE TO DEMONSTRATED MATRIX EFFECT.

(DETECTED, BUT BELOW QUANTITATION LIMIT; ESTIMATED VALUE)



1433NASP#3A(SW) 10-26-92 4:30

**WO #:** 98803

LAB #: A2J270006-009

DATE RECEIVED: 10/27/92

MATRIX: SOLID

| PARAMETER          | RESULT | REPORTIN<br>LIMIT |   | <u>METHOD</u> | PREPARATION - ANALYSIS DATE | QC<br><u>BATCH</u> |
|--------------------|--------|-------------------|---|---------------|-----------------------------|--------------------|
| Solids, Total (TS) | 97     | 0.5               | x | USEPA 160.3   | 10/28-10/29/92              | 303004             |

BOTE: AS RECEIVED



QUALITY CONTROL SECTION



#### QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Sample A2J270006-001, 002, 006, 007, 008 and 009 requested for Volatile Organic analysis has elevated detection limits due to Tics.

"DIL" in the analytical report means that due to high concentrations of analytes in the sample, a dilution was made and the surrogates or spiking compounds could not be quantitated.



QC BATCH: 303046

LAB #: A2J290000-046 C

MATRIX: SOLID

PREPARATION DATE: 10/28/92

DATE ANALYZED: 10/28/92

## ----- Volatile Organics, GC/MS ------

| COMPOUND           | SPIKE<br>PERCENT<br>RECOVERY | Q/C<br>LIMITS |
|--------------------|------------------------------|---------------|
| 1,1-Dichloroethene | 113                          | ( 56-139)     |
| Trichloroethene    | 100                          | ( 79-128)     |
| Chlorobenzene      | 96                           | (79-118)      |
| Toluene            | 96                           | ( 78-122)     |
| Benzene            | 108                          | (77-122)      |



QC BATCH: 303057

LAB #: A2J290000-057 C MATRIX: SOLID

PREPARATION DATE: 10/29/92

DATE ANALYZED: 10/29/92

----- Volatile Organics, GC/MS -------

|                    | SPIKE<br>PERCENT | Q/C       |
|--------------------|------------------|-----------|
| COMPOUND           | RECOVERY         | LIMITS    |
| 1,1-Dichloroethene | 107              | ( 56-139) |
| Trichloroethene    | 91               | ( 79-128) |
| Chlorobenzene      | 90               | ( 79-118) |
| Toluene            | 87               | ( 78-122) |
| Benzene            | 91               | (77-122)  |



QC BATCH: 307037

LAB #: A2K020000-037 C

MATRIX: SOLID

PREPARATION DATE: 10/28/92

DATE ANALYZED: 10/30/92

| COMPOUND           | SPIKE<br>PERCENT<br>RECOVERY | Q/C<br>LIMITS |
|--------------------|------------------------------|---------------|
| 1,1-Dichloroethene | 133                          | ( 56-139)     |
| Trichloroethene    | 105                          | ( 79-128)     |
| Chlorobenzene      | 103                          | (79-118)      |
| Toluene            | 114                          | ( 78-122)     |
| Benzene            | 107                          | ( 77-122)     |



QC BATCH: 307038

LAB #: A2K020000-038 C

MATRIX: SOLID

PREPARATION DATE: 10/30/92

DATE ANALYZED: 11/02/92

## 

| COMPOUND           | SPIKE<br>PERCENT<br>RECOVERY | Q/C<br>LIMITS |
|--------------------|------------------------------|---------------|
| 1,1-Dichloroethene | 110                          | ( 56-139)     |
| Trichloroethene    | 97                           | ( 79-128)     |
| Chlorobenzene      | 98                           | ( 79-118)     |
| Toluene            | 99                           | ( 78-122)     |
| Benzene            | 97                           | (77-122)      |



LAB #: A2J270006

|  | INORGANIC | ANALYTICAL | REPORT |
|--|-----------|------------|--------|
|--|-----------|------------|--------|

| COMPOUND           | SPIKE<br>PERCENT<br>RECOVERY | LIMITS    | <u>MATRIX</u> | PREPARATION - ANALYSIS DATE | Q/C<br>BATCH |
|--------------------|------------------------------|-----------|---------------|-----------------------------|--------------|
| Solids, Total (TS) | 100                          | ( 89-110) | SOLID         | 10/28-10/29/92              | 303004       |



LAB #: A2J290000-046

MATRIX: SOLID

----- VOLATILE ORGANICS, GC/MS -----

| PARAMETER                                                            | RESULT (ug/kg) | REPORTING<br>LIMIT | EXTRACTION-<br>ANALYSIS DATE     | QC<br><u>BATCH</u>         |
|----------------------------------------------------------------------|----------------|--------------------|----------------------------------|----------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>ND | 5<br>5<br>5        | 10/28/92<br>10/28/92<br>10/28/92 | 303046<br>303046<br>303046 |
| 1,1,1-Trichloroethane                                                | ND             | 5                  | 10/28/92                         | 303046                     |

| SURROGATE RECOVERY                  | <u>%</u>   | ACCEPTABLE LIMITS          |
|-------------------------------------|------------|----------------------------|
| 1,2-Dichloroethane-d4<br>Toluene-d8 | 109<br>100 | ( 70 - 121)<br>( 81 - 117) |
| Bromofluorobenzene                  | 100        | (74 - 121)                 |

NOTE:



LAB #: A2J290000-057

MATRIX: SOLID

---- VOLATILE ORGANICS, GC/MS -----

| PARAMETER                                                            | RESULT (ug/kg ) | REPORTINGLIMIT | EXTRACTION-<br>ANALYSIS DATE     | QC<br><u>BATCH</u>         |
|----------------------------------------------------------------------|-----------------|----------------|----------------------------------|----------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>ND  | 5<br>5<br>5    | 10/29/92<br>10/29/92<br>10/29/92 | 303057<br>303057<br>303057 |
| 1,1,1-Trichloroethane                                                | ND              | 5              | 10/29/92                         | 303057                     |

| SURROGATE RECOVERY                  | <u>%</u> | ACCEPTABLE LIMITS          |
|-------------------------------------|----------|----------------------------|
| 1,2-Dichloroethane-d4<br>Toluene-d8 | 89<br>96 | ( 70 - 121)<br>( 81 - 117) |
| Bromofluorobenzene                  | 80       | (74 - 121)                 |

NOTE:



LAB #: A2K020000-037

MATRIX: SOLID

| PARAMETER                                                            | RESULT (ug/kg_) | REPORTING<br>LIMIT | EXTRACTION-<br>ANALYSIS DATE                       | QC<br><u>BATCH</u>                 |
|----------------------------------------------------------------------|-----------------|--------------------|----------------------------------------------------|------------------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>ND  | 620<br>620<br>620  | 10/28-10/30/92<br>10/28-10/30/92<br>10/28-10/30/92 | 307037<br>307037<br><b>3070</b> 37 |
| 1,1,1-Trichloroethane                                                | ND              | 620                | 10/28-10/30/92                                     | 307037                             |

| SURROGATE RECOVERY                  | <u>%</u>   | ACCEPTABLE LIMITS          |
|-------------------------------------|------------|----------------------------|
| 1,2-Dichloroethane-d4<br>Toluene-d8 | 104<br>103 | ( 70 - 121)<br>( 81 - 117) |
| Bromofluorobenzene                  | 103        | ( 74 - 121)                |

NOTE:



LAB #: A2K020000-038

MATRIX: SOLID

----- VOLATILE ORGANICS, GC/MS -----

| PARAMETER                                                            | RESULT (ug/kg) | REPORTING<br>LIMIT | EXTRACTION-<br>ANALYSIS DATE     | QC<br><u>BATCH</u>         |
|----------------------------------------------------------------------|----------------|--------------------|----------------------------------|----------------------------|
| 1,1-Dichloroethane<br>1,2-Dichloroethene, Total<br>Tetrachloroethene | ND<br>ND<br>ND | 620<br>620<br>620  | 10/30/92<br>10/30/92<br>10/30/92 | 307038<br>307038<br>307038 |
| 1,1,1-Trichloroethane                                                | ND             | 620                | 10/30/92                         | 307038                     |

| SURROGATE RECOVERY                                  | <u><b>%</b></u>   | ACCEPTABLE LIMITS                         |
|-----------------------------------------------------|-------------------|-------------------------------------------|
| 1,2-Dichloroethane-d4 Toluene-d8 Bromofluorobenzene | 116<br>112<br>116 | ( 70 - 121)<br>( 81 - 117)<br>( 74 - 121) |

NOTE:





#### INTRA-LAB BLANK REPORT

LAB #: A2J270006

|                    | INORGA | NIC ANALYTIC       | CAL REPO | )RT    |                             |                    |
|--------------------|--------|--------------------|----------|--------|-----------------------------|--------------------|
| PARAMETER          | RESULT | REPORTING<br>LIMIT | UNIT     | MATRIX | PREPARATION - ANALYSIS DATE | QC<br><u>BATCH</u> |
| Solids, Total (TS) | ND     | 0.5                | x        | SOLID  | 10/28-10/29/92              | 303004             |

ND



#### MATRIX SPIKE REPORT

QC BATCH: 303046

LAB #: A2J270006-003 S

MATRIX: SOLID

WO #: 98796

PREPARATION DATE: 10/28/92

DATE ANALYZED: 10/28/92

### ----- Volatile Organics, GC/MS ------

| COMPOUND           | SPIKE<br>PERCENT<br>RECOVERY | SPIKE/DUF<br>PERCENT<br>RECOVERY | Q/C<br>LIMITS | RPD | RPD<br>LIMITS |
|--------------------|------------------------------|----------------------------------|---------------|-----|---------------|
| 1,1-Dichloroethene | 90                           | 109                              | ( 59-153)     | 19  | ( 0- 27)      |
| Trichloroethene    | 91                           | 86                               | (77-134)      | 6   | (0-16)        |
| Chlorobenzene      | 86                           | 89                               | (77-122)      | 3   | ( 0- 20)      |
| Toluene            | 106                          | 114                              | (73-139)      | 8   | (0-21)        |
| Benzene            | 78                           | 91                               | ( 81-127)     | 15  | ( 0- 19)      |



CHAIN OF CUSTODY RECORD

|                                                            |                       | <u> </u>      | 1771            |                      | <u> </u>     |                |                                              |                                              |              | $\frac{O_1}{O_1}$ |             |           | LVI     | <u> </u> | OILD               |                    |                   |                   |          |                   |
|------------------------------------------------------------|-----------------------|---------------|-----------------|----------------------|--------------|----------------|----------------------------------------------|----------------------------------------------|--------------|-------------------|-------------|-----------|---------|----------|--------------------|--------------------|-------------------|-------------------|----------|-------------------|
| PROJECT NO. OOGY OOL                                       | ···                   |               | ≶  /c⊦          | MPLE<br>(PE<br>(ECK) | ANA<br>REQ   | LYSE:<br> UIRE |                                              |                                              |              |                   | <u> </u>    |           |         |          |                    | 7                  |                   |                   | PRES     | ERVATION<br>4     |
| PRINTED NAME COMMENTAL DATE SAMPLE NO. DATE                | )<br> <br> <br>  TIME | Jam<br>MATRIX | NUMBER OF CONT. | ox /                 |              | / 7            | 3                                            |                                              |              |                   |             |           |         |          | OR SAM             | EMARKS<br>PLE LOCA | ATION             |                   | CED      | SPECIFY CHEMICALS |
| 14245ASP32 10/28                                           | 2.15                  | Soil          | 1 1             |                      | X            | X              | X                                            | X                                            |              |                   |             |           |         |          |                    |                    |                   |                   | V        |                   |
| 1426 SASC(36) 0/25/12                                      | 215                   | Soil          | 1 0             |                      | 义            | 文              | X                                            | X                                            | ļ            |                   |             |           |         |          |                    |                    |                   |                   | ~        |                   |
| 1426 SASP (3C) Washa                                       |                       | Soil          | 1 /             | 1_                   | X.           | X              | 入                                            | 入                                            | ļ            |                   |             |           |         |          | <u> </u>           |                    |                   |                   | V        |                   |
| 1428 MASPAYM W1447                                         |                       | 1501          | 1 0             | ↓_                   | 1            | X              | Ľ                                            | メ                                            | -            |                   |             |           |         |          |                    |                    | <del></del>       |                   | V        |                   |
| 1429 NAS PI4(S) 473 413                                    |                       | 5011          | 1 1             | <del> </del> _       | 7            | 1              | 之                                            | 关                                            | <u> </u>     |                   |             |           |         |          |                    |                    |                   |                   | V        |                   |
| 14 30 NASFAZ (NE H244)                                     |                       | Soil          | IV              | <del> </del>         | X            | X              | Ι×                                           | 14                                           | <u> </u>     |                   |             |           |         |          |                    |                    |                   |                   | V        |                   |
| 1431 NASPA3 WWW 12442                                      |                       | 501           | リン              | -                    | 7            | X              | <u>                                     </u> | <u>                                     </u> | <del> </del> |                   |             |           | _       |          |                    |                    | · <del></del>     |                   | <b>V</b> |                   |
| 1437 NYSPH3. (SE) 142412                                   |                       | 50,1          | 1 /             | -                    | 人            | <u> </u>       | 人                                            | <u>  X</u>                                   | <u> </u>     |                   |             |           |         |          | <br>               |                    |                   |                   | Y        |                   |
| 1433 NASP # 3- (Sw) 14244                                  | 4 30                  | 50,1          | 1, 1            | -                    | <del> </del> | 17             | 푗                                            | *                                            | -            |                   |             |           |         |          |                    |                    |                   |                   | -        |                   |
|                                                            | _                     |               |                 | -                    | ļ            |                |                                              | <u> </u>                                     |              |                   |             |           |         |          |                    | •                  | <del>-</del>      |                   | $\dashv$ |                   |
|                                                            |                       |               | $\vdash$        | +-                   | <u> </u>     | _              |                                              |                                              |              |                   |             |           |         |          |                    | <u> </u>           |                   |                   | $\dashv$ |                   |
| Korn M. Denke                                              | 14 23/12<br>DATE 1    | THAE          | 7               | 18                   | المحاد       | ) (SIGN        | ATURE):                                      |                                              |              | <u> </u>          | e           | d<br>SHIP | Į.      | X        |                    | 100                | 59640<br>SHIPPING | OLY<br>TICKET NO. |          | <del>න</del>      |
|                                                            | 14 23/12<br>DATE      |               | /.              |                      |              | . /*****       | · D 100*                                     |                                              | RE           | MARK              | <b>S</b> :  |           |         |          |                    |                    |                   |                   |          |                   |
| RELINQUISHED BY (SIGNATURE):  RELINQUISHED BY (SIGNATURE): | DATE                  | TIME          |                 |                      | SHED TO      |                |                                              |                                              |              |                   |             | •         |         |          |                    |                    |                   |                   |          | 20                |
| CONTRACT LAS                                               | 7                     |               | (17.6.          | : <i>_</i> _         |              | 19/1/<br>27/   | $\top$                                       | TIME                                         | > Tl         | JRNA<br>REQ       | KOL<br>UIŖE | JND<br>D  | ĮX<br>L | 2        | 4 HOURS<br>8 HOURS | •                  | □ NORMA □ OTHER   |                   |          | 4                 |

6 8 0255

ATTACHMENT 3
WEATHER INFORMATION

6 8 0257

### HOME VALLEY LANDFILL WEATHER CONDITIONS

| DATE | HORNING<br>TEMP | CONDITION | PRECIP<br>(INCHES) | SOIL TEMP<br>(A.M.) | AFTERNOON<br>TEMP | CONDITION | PRECIP<br>(INCHES) | SOIL TEMP<br>(P.M.) | EVENING<br>TEMP | CONDITION | PRECIP<br>(INCHES) |
|------|-----------------|-----------|--------------------|---------------------|-------------------|-----------|--------------------|---------------------|-----------------|-----------|--------------------|
| 9/2  |                 |           |                    |                     | 74                |           | 0.2                | 77                  |                 |           |                    |
| 9/3  | 66              | rain      | 0.06               | 66                  | 79                |           | 0.0                | 88                  |                 |           |                    |
| 9/4  |                 |           |                    |                     | 79                |           | 0.03               | 82                  |                 |           |                    |
| 9/5  |                 |           |                    |                     |                   |           |                    |                     |                 |           |                    |
| 9/6  |                 |           | C0.5               |                     |                   |           |                    |                     |                 |           |                    |
| 17   |                 |           |                    |                     |                   |           |                    |                     |                 |           |                    |
| 9/8  | 72              |           | 0.4                | 73                  | <b>43</b>         |           | 0                  | 108                 | 86              |           | 100                |
| 9/9  |                 |           |                    |                     |                   |           |                    |                     |                 |           |                    |
| 9/10 | 66              |           | 0.08               | 65                  |                   |           |                    |                     |                 |           | ·                  |
| 9/11 | 50              |           | 0                  | 50                  |                   |           |                    | 85                  |                 |           |                    |
| 9/12 |                 |           |                    |                     |                   |           |                    |                     |                 |           |                    |
| 9/13 |                 |           |                    |                     |                   |           |                    |                     |                 |           |                    |
| 9/14 | 57              | clear     | 0                  | 57                  |                   |           |                    |                     |                 |           |                    |
| 1/15 | 54              | dear      | 0                  | 54                  |                   |           |                    |                     |                 |           |                    |



### HOWE VALLEY LANDFILL WEATHER CONDITIONS

| DATE | MORNING<br>TEMP | CONDITION | PRECIP<br>(INCHES) | SOIL TEMP<br>(A.H.) | AFTERNOON<br>TEMP | COMDITION | PRECIP<br>(INCHES) | SOIL TEMP<br>(P.M.) | EVENING<br>TEMP | CONDITION | PRECIP<br>(INCHES) |
|------|-----------------|-----------|--------------------|---------------------|-------------------|-----------|--------------------|---------------------|-----------------|-----------|--------------------|
| 9/16 | 61              | Charly    | 0                  | 61                  |                   |           |                    |                     |                 |           |                    |
| 9/17 | 62              | dear      | 0                  | 62                  |                   |           |                    |                     |                 |           |                    |
| 9/18 | 68              |           | 0.19               |                     |                   |           |                    |                     |                 |           |                    |
| 4/19 | 54              | doudy     | 70                 |                     |                   |           |                    |                     |                 |           |                    |
| 9/20 |                 |           | \$0,32             |                     |                   |           |                    |                     |                 |           |                    |
|      |                 | cloudy    |                    |                     |                   |           |                    |                     |                 |           |                    |
| 9/22 | 70              | doudy     | 0.94               |                     |                   |           | 0,09               |                     |                 |           |                    |
| 9/23 | 42              | clear     | 0.10               |                     |                   |           |                    |                     |                 |           |                    |
|      | 43              | dear      | 0                  |                     |                   |           |                    |                     |                 |           |                    |
| 9/25 | 59              | cloudy    | 0                  |                     |                   |           |                    |                     |                 |           |                    |
| 9/26 | 66              | cloudy    | 70                 |                     |                   | rain      |                    |                     |                 |           |                    |
| 9/27 |                 |           | 50,37              |                     |                   |           |                    |                     |                 |           |                    |
| 9/28 | '               | clear     |                    |                     |                   |           |                    |                     |                 |           |                    |
| 1/29 | 4(              | clear     | 0                  |                     |                   |           |                    |                     |                 |           |                    |

9/30 32 dear O



## HOWE VALLEY LANDFILL WRATHER CONDITIONS

| DATE  | MORNING<br>TEMP | CONDITION      | PRECIP<br>(INCHES) | SOIL TEMP<br>(A.H.) | AFTERNOON<br>TEMP | CONDITION | PRECIP<br>(INCHES) | SOIL TEMP<br>(P.M.)                     | EVENING<br>TEMP | CONDITION | PRECIP<br>(INCHES) |
|-------|-----------------|----------------|--------------------|---------------------|-------------------|-----------|--------------------|-----------------------------------------|-----------------|-----------|--------------------|
| 10/1  | 36              | clear          | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 10/z  | 37              | dear           | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 10/3  | 41'             | clear          | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 10/4  |                 | •••            |                    |                     |                   |           |                    |                                         |                 |           |                    |
| 10/5  | 48              |                | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 2/6   | 32              | clear          | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 10/7  | 38              |                | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 0/8   | 57              | 13-fit<br>reln | 0.04               |                     |                   |           |                    | *************************************** | 14              | rain      | 1.02               |
| 10/9  | 40              | dosdy          | 0.20               |                     |                   |           |                    |                                         | -               |           |                    |
| 10/10 | 42              | Pt.clardy      | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 10/11 |                 |                |                    |                     |                   |           |                    |                                         |                 |           |                    |
|       | ſ               | dear           | 1 1                |                     |                   |           |                    |                                         |                 |           |                    |
| 10/13 | 33              | Pt. clary      | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |
| 10/14 | 57              |                | 0.0                |                     |                   |           |                    |                                         |                 |           |                    |

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|       | 2 2 6 6 6 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | 10/15 10/15 10/15 10/15 10/16 10/18 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 10/19 |
|       | S8 30 60 PERF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|       | Clear O.O.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 0.0   | PRECIP (INCHES)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|       | SOIL TEMP (A.M.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 88    | HOME VALLEY LANDFILL WEATHER CONDITIONS  AFTERNOON TEMP CONDITION TEMP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Sonny |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 0.0   | PRECIP (INCHES)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|       | SOIL TEMP (P.M.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|       | TEMP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|       | MOLLIGHCO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|       | PRECIP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



### SHOLLIGHOO SHELVEN TILIGHYI 1777YA 2008

| PRECIP ( INCHES) | C / For                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Co <sub>n</sub><br>Legi<br>Rabibe                                                                                  | SOIL TEMP (P.N.) | (IRCEREZ)<br>MARCID | MOILIUMOO                            | NATION OF THE PARTY OF THE PART | SOIL TESP<br>(A.N.) | (ESTENT)<br>(O.O | 0000000000000000000000000000000000000            | 20, E IL                          | 3740<br>CP\X\01 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|---------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|--------------------------------------------------|-----------------------------------|-----------------|
| 0.0              | 12 June 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 25                                                                                                                 | (1)              | 0.0<br>0.0          | Anap Luuns                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     | £0.              | Calm to over cast                                | 10 05<br>Pund LC                  | १०(३५/५५        |
| O.0              | clerr<br>coudy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | وم عسر<br>وسير<br>دسير                                                                                             | ,02              | 0.0                 | Agree Linus                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     | 0.0              | בלפה אינה היא היא היא היא היא היא היא היא היא הי | 30 desma<br>300 orth<br>113. desm | eyscha          |
| 0,0              | Khuula                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 24 3 4 Nu                                                                                                          | LS               | 0.0                 | Heay                                 | 1,72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     | 0.0              | Pt. cloudy                                       | عاد مارد<br>عام مارد              | er/rc/01        |
| 0.0              | المرابع                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ار کوسم<br>۱۳۵۲                                                                                                    | °9 i             | µo.                 | 4.5.1                                | ,1S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     | 0.0              | Claudy A<br>19ht mind<br>MM' man                 | Bo oir g                          | - १०। ३०/४३     |
| 0.0              | moshy cloudy, I will                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                    | ,55              | 0.0                 | ولمراح الم                           | .19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     | "ro.1            | لامائح                                           | وم مند                            | CP/clin         |
| he.              | Cloudy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ع بر برر<br>ع بر برر                                                                                               | ్డ 59            | 0.0                 | thus                                 | ్డిని                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     | 0.0              | دامم<br>دمامی                                    | علاه دار ا                        | CP  E 11        |
| 0.0              | בלמשל                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | عوارمهم                                                                                                            | ,6h              | 0.0                 | Clandy                               | ah                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     | "hc.             | Chudi                                            | Pung Ch                           | ८८।भाग          |
| 0.0              | Claudy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | مام مام مام المام<br>المام مام المام |                  | D. D                | בלטול אינה<br>האון אינה<br>האין אינה |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     | 0.0              | دمي الألا                                        | shair se                          | }               |
| 0.0              | Cloudy (Mw)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | pura Coh                                                                                                           | Lh               | 0.0                 | ولماطا                               | zh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     | 0.0              | Plocals<br>Plocals                               | یاه کرمس<br>عدر مار               | ווכולם          |
| ۵.0              | Cloury.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 25 - 'x B                                                                                                          | ,25              | 0.0                 | Thuulo                               | <u>,</u> 5 S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     | 0.0              | בנסוסלי שונים                                    | אש מיג ל                          | crisin          |
| 0.6              | בויאן מינים כן כן מינים אינים | 400 6677                                                                                                           |                  | 25                  | ۲۵٬۱۷                                | ეე                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     | 0.0              | Chudy.)                                          | 14 Sin                            | CPlot  11       |
| 0.6              | filean<br>fluds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ما عرب مم<br>ما عرب مم                                                                                             | ah               | 0.0                 | i                                    | ۹                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     | ן אכין           | داصر<br>رداس                                     | · · · ·                           | }               |
| b.6              | 14chudy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                    | ,LS              | 0.0                 | them ship                            | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     | 0.0              | 4 thuss<br>went of                               | · · ·                             | chulu           |



# HOME VALLEY LANDFILL WEATHER CONDITIONS

| DATE     | MORNING<br>TEMP | CONDITION        | PRECIP<br>(IECEES) | SOIL TEMP | AFTERBOOK<br>TEMP | CONDITION      | PRECIP<br>(INCHES) | SOIL TEMP<br>(P.H.) | EVENING<br>TEMP | CONDITION | PRECI: |
|----------|-----------------|------------------|--------------------|-----------|-------------------|----------------|--------------------|---------------------|-----------------|-----------|--------|
| 11/18/12 | 490 F           | H. Clary         | <u>م</u> ه         | 53°F      | 66°               | Showing Clear: | 6.0                |                     | 48F             | chay      | 0.0    |
| 11/19/92 | 40°F            | Cloudyw/         | 0.0                | 43°F      | 61°               | Chudy          | 0.0                | 59°F                |                 |           |        |
| 11/23/92 | 43°F            | cloudy           | 2.45               | 47° F     | 44 "              | Clary          | 0.0                | 46°F                |                 |           |        |
|          |                 |                  |                    |           |                   |                |                    |                     | ,               |           |        |
| 91/92    | 21°F            | Clear            | 0.0                | 28°F      | 36° E             | Clary          | 00                 | -8ª                 |                 |           |        |
| 12/92    | 32°F            | premay           | 0.65               | 39°F      | 42°E              | Marily         | 0.0                | 39° F               |                 |           |        |
| 13/92    | 25°F            | Pt Clary<br>Cake | 0.6                | 30°F      | 36° F             | clady          | 0.0                | 42F                 |                 |           |        |
| 17/4/92  | 47°F            | cloudy           | 0.03               | 41°F      | 45°F              | cloudy         | 0.0                | 42°F                |                 |           |        |
| 45/9     |                 |                  |                    |           | •                 |                |                    |                     |                 |           |        |
| 12/6/42  |                 | some 550         |                    |           |                   |                |                    |                     |                 |           | -      |
| 12/7/92  | 33°F            | clardy           | 005                | 410=      | 35F               | Cloudy         | 0.6                | -                   |                 |           |        |
| 12/8/22  | 1               | chudy            | 00                 | 36° F     | 30°F              |                | 0.0                | -                   |                 |           | -      |
| 12/4/9   | 94°\$           | Cloudy           | 0.0                |           | 36 F              | Cloudy         | 0.0                | AIPF                |                 |           | -      |
|          |                 |                  |                    |           |                   |                |                    |                     |                 |           | 1      |

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|                                            | PRECIP<br>(INCHES)  |          |         |      |       |         |      |         | 0.0     | 0.0                       |  |  |  |
|--------------------------------------------|---------------------|----------|---------|------|-------|---------|------|---------|---------|---------------------------|--|--|--|
|                                            | CONDITION           |          |         |      |       |         |      |         | cloudy  | doud                      |  |  |  |
| ,                                          | EVENING             |          |         |      |       |         |      |         | 31°F    |                           |  |  |  |
|                                            | SOIL TEMP<br>(P.M.) |          |         |      |       |         |      |         | 40%     |                           |  |  |  |
|                                            | PRECIP<br>(INCHES)  |          |         |      |       |         |      |         | 0.0     | 0.0                       |  |  |  |
| LAIDPILL                                   | CONDITION           |          |         |      |       |         |      |         | closely | choudy                    |  |  |  |
| BOKE VALLEY LANDFILL<br>WRATHER CONDITIONS | APTERNOON<br>TEMP   |          |         |      |       |         |      |         |         |                           |  |  |  |
|                                            | SOIL TEMP<br>(A.H.) |          |         |      |       | 390F    |      |         | 370F    | 330F                      |  |  |  |
| •                                          | PRECIP<br>(INCRES)  | 0.49"    | 0.17"   |      |       | 0.0     |      |         | 0.0     | 0.0                       |  |  |  |
|                                            | CONDITION           | rair     | ra.12   |      |       | cloudy  |      |         | cloudy  | Closely<br>styles<br>wind |  |  |  |
|                                            | HORNING<br>TEMP     | 370F     | 30F     |      |       | 32°F    |      |         | 78°F    | 310F                      |  |  |  |
|                                            | DATE                | 20/01/21 | 2411/21 | 4/12 | 81/21 | 24/1/21 | apsp | 14/9/41 | 2411/21 | 13/8/65                   |  |  |  |